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THE JOURNAL OF LAND & PUBLIC UTILITY ECONOMICS

Forty Years of Public Ownership
EARL H. BARBER

The Weak-and-Strong-Road Problem
D. PHILIP LOCKLIN

Production and Consuming Power
WILLFORD I. KING

Trend of Electric Rates
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Electricity Supply in Great Britain
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Land Tenure Research
M. M. KELSO

Transportation in the District of Columbia
CHARLES F. MARSH

VOLUME X NUMBER 4 NOVEMBER 1934 PRICE $1.25 A COPY

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THE JOURNAL OF LAND & PUBLIC UTILITY ECONOMICS

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THE JOURNAL OF LAND & PUBLIC UTILITY ECONOMICS

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STATEMENT OF THE OWNERSHIP, MANAGEMENT, CIRCULATION, ETC., REQUIRED BY THE ACT OF CONGRESS OF AUGUST 24, 1912,

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County of Cook }

Before me, a notary public in and for the State and county aforesaid, personally appeared Helen C. Monchow, who, having been duly sworn according to law, deposes and says that she is the managing editor of the Journal of Land and Public Utility Economics, and that the following is, to the best of her knowledge and belief, a true statement of the ownership, management (and if a daily paper, the circulation), etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, embodied in section 411, Postal Laws and Regulations, printed on the reverse of this form, to wit:

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THE JOURNAL OF LAND & PUBLIC UTILITY ECONOMICS

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Forty Years of Public Ownership

By EARL H. BARBER

TWO events in recent years have brought about a marked change in the sentiment toward public relations of electric utilities. The speculation of the late twenties, dramatized by Insull's flight to Greece, shook the public's faith in the tradition of the far-sighted wisdom of the directors of the electric industry. The action of the present administration in giving public ownership a place in the program of public works abruptly took the subject out of the realm of controversy and made it an accomplished fact. The St. Lawrence power project is receiving presidential support, Boulder Dam is being built, Muscle Shoals, after 12 years of lying about, is now incorporated into a publicly owned system designed to supply electricity direct to the small consumer, and federal funds have been made available to municipalities for building electric plants.

Gratifying as these events may be to the advocates of public ownership, there is danger that the sudden change in public sentiment may have an unfortunate effect on the future of the movement. Too much may be expected from the mere application of what is only an alternative method of service, and disillusionment may come a decade hence when the rates of publicly operated plants are compared with those under private control. This danger is foreshadowed by the experience of the past.

For, strange as it may seem, after all the theoretical arguments of the last 20 years for and against the expedient, public operation of electric utilities is not only a possibility of the future but something which has a past—a past as old as the electric industry itself and so wide and varied that the disposition to ignore it is one of the anomalies of current thought. Advocates of public ownership refer to Seattle's domestic rate which steps from 5½ cents to ¾ cent and opponents refer in turn to the rate of the private electric company in the District of Columbia which steps from 3.9 cents to 1½, but special cases, usually not comparable because they reflect some special circumstance, only

emphasize disagreement and strengthen the impression that public ownership is something essentially untried. Yet in the United States alone over 1,800 municipal electric plants are in operation at the present time.

If the record of municipal operation is ignored by the propaganda of electric companies, the reason is obvious. Enough would be heard about it if it had been less successful than private operation. The reasons why the record is ignored by advocates of public ownership are less obvious, but they may be inferred.

Those who rely on the stock-jobbing practices of "holding companies" for the force of their criticism of private ownership will ignore the record of municipal plants just as they will ignore the record of operating electric companies. Their argument concerns the protection of investors rather than consumers, and would lose its force if an attempt were made to show that the rates of electric companies followed security prices or that the recent speculative flurry produced any disturbance in the relation between the rates of companies and municipal plants. Those who turn to mass-statistics to determine the relative achievements of public and private operation will find the record ambiguous. Discrepancies between the rates of different undertakings of the same class make general averages meaningless, and little improvement results from classifying plants into groups by such simple considerations as size or output. The effect of average consumption, load density, and other factors which influence the cost of supplying electricity carries discrepancies into every group. And when investigators competent to evaluate all the factors entering into the cost of service undertake to make a comparison for the industry as a whole, they find that the necessary records are lacking. Few public service commissions require sufficient data in the reports of electric undertakings to establish the factors required for an intelligent comparison of rates.

In this respect the State of Massachusetts is almost an exception. A State commission was established as early as 1886 with authority to prescribe a system of accounts for electric companies and to require annual reports in such form as it might direct. When in 1891 municipalities were authorized to engage in the electric business, their plants were placed under the supervision of the commission. From the outset the commission required in the annual reports not only a financial statement but such descriptive data as would enable the financial statement to be translated into terms of managerial achievement. As a result, there is now a record of over 40 municipal plants and over 60 electric companies which have operated under a standard system of accounts throughout their existance.

For this reason the municipal plants of Massachusetts have been made the subject of frequent studies, notably the voluminous work of Lincoln[1] in 1915 and the analysis made by Porter[2] in 1930. But none of the attempts to determine the relative merits of private and public operation have been successful, and the tentative conclusions of the older studies, viewed in the light of subsequent experience, show the ephemeral nature of conclusions based on any momentary state of a rapidly changing industry.

[1] Edmund E. Lincoln, *The Results of Municipal Electric Lighting in Massachusetts*, (Boston: Houghton Mifflin Co., 1918).

[2] Charles H. Porter, "A Comparison of Public and Private Electric Utilities in Massachusetts", Massachusetts Institute of Technology, *Publication 884*, 1932.

The purpose of this paper is not to make another attempt to compare the results of private and public ownership in Massachusetts but rather to indicate the causes which have made for the success of municipal operation and the forces which threaten its future. The present position of the municipal plants will be stated briefly, not as a matter of statistical evidence, but as an integrated opinion derived from observation extending over many years.

The municipal plants of Massachusetts are supplying their public as well as the electric companies; they are supplying it more completely, and at lower rates. Several plants have established a domestic rate which permits everything in the house but the furnace to be operated electrically at an average rate of 2⅓ cents, and a movement toward a new low average of 1½ cents has already begun.

But the goal of cheap electricity has yet to be reached. Companies and municipal plants alike are pressing in that direction. At present the municipal plants are leading, and their lower rates constitute the most powerful influence to force the rates of the companies down, but there is no assurance that their dominant position will be continued or that in a few years hence the relative position of municipal plants and companies may not be reversed.

II. Causes of the Success of Municipal Plants

Four principal causes for the success of the municipal plants of Massachusetts may be noted: the salutary provisions of the municipal electric law enacted in 1891; the limitation in size which the nature of the municipal plant imposes; freedom from taxation; and freedom from certain obsessions common to electric companies.

Municipal Electric Law. In the municipal electric law are three provisions which are especially important. The first is that which requires the plants to be self-sustaining. Rates must be fixed to yield every operating expense, interest on the bonded debt, an amount for depreciation fixed by law, and a sufficient reserve to retire any debt in less than 20 years. The too common rumor that the low rates of municipal plants represent subsidies from the tax levy have no foundation in fact.

The clause which provides for the retirement of debt within 20 years has been unexpectedly productive. Unlike electric companies the municipal plants have no refuge in the so-called "capital expense"—something which not only is never paid, but once passed through the routine of the regulatory commission becomes a "prudent investment" on which the public is compelled to pay a "fair return", or in practice a gradually increasing dividend, for all years to come. No one who has not wallowed through the accounts of electric companies and seen the persistent and ingenious methods devised to transmute operating expenses, which must be paid out of income, into capital expenses which are financed by the sale of more securities, can appreciate the haven of refuge which municipal plants are denied.

Staring every municipal manager in the face is the fact that expenses of all kinds must be paid. The result has been frugality (without sacrificing maintenance of lines and equipment) which not only appears in operating expenses but in the cost of the property and in the balance sheet. The tendency has been to avoid interest-bearing debt, to finance plant additions from income, and even to build up a cash surplus for such extraordinary expenses as the construction of a power station.

Only about 10% of the cost of the property of municipal plants is now represented by outstanding debt; the rest has been paid out of earnings. Nearly half of the plants have no debt whatever. In the aggregate all municipal plants require only six cents of each dollar of income for both interest and the retirement of the remaining debt, whereas companies have a continuing burden of 25 cents for dividends and interest.

The second provision of the law to be noted is the one which recognizes that a municipal plant is not merely a self-supporting department of the town but a business calling for responsible leadership. The law requires for every plant the appointment of a manager who "shall have full charge of the operation and management of the plant, the manufacture and the distribution of electricity, the purchase of supplies, the employment of agents and servants, the method, time, place, quantity and quality of the supply, the collection of bills and the keeping of accounts."

In this connection the law provides that a municipality may elect a supervising board of three municipal light commissioners, one to be chosen each year, but if that form of supervision is not adopted the manager is left subject to the general executive of the municipality both in appointment and in direction. But politicians have taken little advantage of their power of appointment and changes in the personnel of the managers have been few. The men have grown up with their plants; they are familiar with every detail of the business; and they have become identified by long residence with the public they serve. Consequently, municipal plants have had, at least as much as electric companies, the advantages of concentrated and effective management.

The third provision of the law which has had a far reaching effect is that which requires all municipal plants to keep their accounts and make annual reports in the form prescribed by the public service commission. Although the form which has been prescribed has proved inadequate for the complicated affairs of many electric companies, it works very well for the simple ways of municipal plants. The various items into which the accounts are divided are supported by descriptive data which not only permit the reasonableness of expenditures to be determined by inspection but enable comparisons to be made with the performance of other plants. This serves as a warning to politicians that extravagance in the administration of a municipal plant cannot be concealed; it assures the public that nothing is being done in the dark; and it calls the manager's attention to the efficiency of his work.

Limitation in Size. Next to the municipal electric law in its influence for successful operation has been the limitation on size which the nature of the municipal plant involves. A municipal plant is denied the possibility of achieving importance by extending the area of its operations or by increasing the size of its financial structure through combination with other plants to form a chain. Any ambition toward greatness leads to intensive development of the existing field as the only means of fulfillment.

Both these limitations are usually held to be an unfortunate concomitant of municipal operation, but it is held otherwise here. The electric plant which is obliged to deal with a large area and undertake simultaneously the problems of an industrial center, residential suburbs, and a rural frontier shows at a disadvantage when compared with plants having a smaller or more homogeneous field.

Of the lack of the benefits of "chain" management it may be noted that no municipal plant acquires other plants at exorbitant prices on which the chain as a whole must pay dividends to keep the association (holding company) solvent; no plant must sustain rates to compensate for weak links in the chain; no plant is required to build up a cash surplus to lend to the holding association. Nor is management "chained" in the attempt to substitute a central-office system for intelligence on the spot. Chain management may show remarkable economy when operating expenses are considered alone, but when operating expenses, management fees, and the cost of capital are all brought home, there is nothing remarkable about the resulting rate.

Freedom from Taxation. The third of the principal causes of the success of the municipal plants is freedom from taxation. They are exempt from local, state, and federal taxes—taxes that take an average of 12% of an electric company's income. When it is stated that 12% of income, if accumulated over a period of 25 years, would make an amount equivalent to the cost of the plant, it becomes evident that tax exemption has contributed substantially to the extraordinarily strong condition shown by the consolidated balance sheet of the municipal plants.

Yet, in view of the oft-repeated charge that municipal plants are able to maintain lower rates than companies because of tax-exemption alone, it should be noted that every municipal plant in the State could pay the local property tax equivalent to 7% of its income without disturbing the present level of rates, and the full average of 12% paid by the companies could be paid by municipal plants without increasing their rates by more than a small fraction of a cent.

Of the state and federal taxes, or any tax based on profits or the market value of securities, it is enough to say that they are not applicable to plants having no securities and operating at cost rather than for a profit. The local property tax is applicable to municipal plants, and in justice to the taxpayer it should be applied. Some municipal plants realize this, pay the town a small equivalent to the property tax, and still maintain low rates. Others make no such payments. Still others pay the town an amount greater than any possible tax, sometimes taking as much as 25 cents from each dollar of income. They go to the opposite extreme and maintain an unduly low tax rate at the expense of the consumers of electricity. As might be expected, no plants of this class are distinguished by low rates.

In view of these divergent practices there is no average figure for municipal plants corresponding to the 12% tax paid by electric companies. All that can be said is that some municipal plants pay a property tax equivalent to 7% of their income and still keep in the group which maintains the lowest rates in the State.

Freedom from Obsessions of Private Companies. Freedom from certain obsessions of electric companies was given as the fourth of the major causes of the success of municipal operation. Among the obsessions which have afflicted the companies have been aversion to industrial power plants, fear of going below a standard level of rates, and dread of politicians.

In their attitude toward industrial power plants municipal managers have been far saner than the directors of companies. For nearly 30 years electric companies have been working toward a monopoly in the production of power, offering rates which made the abandon-

ment of factory engine rooms attractive to owners, conducting propaganda against efficient small generators developed abroad, cutting power rates to prevent the installation of such equipment when enterprising manufacturers became aware of their economy, and building greater and greater power stations to handle the industrial load they had acquired. About a generation ago the Legislature added panic to obsession by departing from the theory of regulated monopoly and chartering "bulk supply" companies to meander about and compete with local companies for industrial loads.

At that time the possibilities of the residential load were not foreseen. Local companies fought against the invaders as though their future depended on the industrial load alone. Power prices dropped below the embarrassing level, bulk-supply companies were driven into buying control of local companies to get a market for their output. Then industry declined from the peak for which power stations were built, and since then companies have been looking at idle equipment and learning the value of the domestic load—a load which for volume, diversity, and steadiness, in season and out, surpasses any promise the industrial load has ever shown.

From this scramble for power customers municipal plants have been generally free. Where industrial plants were in operation in their territories, they let them operate, sometimes even buying or exchanging power. Consequently, they have not been obliged to earn on an idle investment during the last four years, and with the growing demand for electricity for residential use they have been able to increase their output and reduce their rates.

The fear of inaugurating low rates, to which electric companies have been subject, has hardly been felt by the managements of municipal plants. The fear is a product of "rate regulation" from which municipal plants are exempt. The electric companies in Massachusetts are not. Every company rate must be approved by the regulatory commission before it becomes effective, and a rate case may be initiated at any time by motion of the commission or by popular petition.

It is well known that the most powerful argument which can be urged against any rate is the fact that some other company has one that is lower. There may be no merit in the argument whatever, but it has a strong popular appeal which embarrasses a regulatory commission acutely to be obliged to ignore. It follows that the management of any company will find itself extremely unpopular with its associates in the industry if it breaks through the established level of rates.

Knowledge of this fact is responsible for such practices as piling up large surpluses for which there is no practical use, rebating to the customer one month's bill out of 12, or appealing some trifling rate case to the federal courts when common sense indicates a reduction and the increasing prosperity of the company makes it impossible to maintain the case in court.

Municipal plants are governed by no such incentives. They are outside the organization of the electric industry and free to set rates without regard to what the mass-interest of the industry may be held to require. A municipal manager may fix rates with regard only to the cost of the service, he may experiment with novel forms of rates, he may even establish a rate so low that it can be justified only by his belief that he can make it work. The manager of a company is bound by less simple considerations.

It may seem paradoxical to ascribe to municipal plants freedom from fear of politicians, which was listed as one of the obsessions of electric companies; that "public ownership means politics" has been asserted so often that it has come to have the force of an axiom. But a prolonged acquaintance with the troubles of company and municipal managers makes it clear that there is little difference in the political difficulties of their positions. Each complains bitterly of what he calls politics, but each uses the word with a different meaning.

The phase of politics which the companies dread is that which is inspired by the Department of Public Utilities. Any local politician, or would-be politician, who can get 19 other signatures to a petition and can induce perhaps a dozen signers to accompany him to a hearing, can get a rate case under way. Once under way the conduct of the incongruous performance is simple. By asking to have information compiled by the company and then asking for more, by putting in "exhibits" purporting to show something which will require weeks of statistical labor to disprove, a management can be kept from vacations, working nights and Sundays, for the best part of a year.

But more is involved than temporary inconvenience. Difficulties of management are enormously increased by public distrust, and a portion of the public will inevitably be aroused by the mere fact of a contest to take sides against the company. As an aftermath, there will be an impairment of public relations which will require years to live down.

The management of a municipal plant is not obliged to cope with this aspect of practical politics. The manager, not the Department of Public Utilities, is the arbiter of rates, and political capital cannot be made out of them if they are kept within the limits prescribed by law.

III. Dangers Threatening Municipal Operation

If the isolation of municipal plants brought about by law and circumstance were complete—if it were possible for them to be operated solely in the interests of their customers—there would be little doubt about their future. But their isolation is not complete, and there are forces at work which may cause them to yield the leading position they now hold and even become absorbed by the electric companies in the course of a comparatively few years. The principal conditions which militate against the continuation of their success are the inadequacy of the municipal electric law, political interference with the direction of plants, the hostility of the electric industry, and the absence of a cooperative movement among the managements of the plants.

Writing some 15 years ago, the predecessor of the Department of Public Utilities said: "The statutory provisions governing the operation of municipal lighting plants are designed as far as is practicable to permit such plants to be operated on a business basis as though independently owned and operated." At the time it was written the statement may have been true, but it is true no longer. In the last 10 years the development of the law has been neglected and the plants have grown from infancy to substantial industries operating without adequate control.

Neither in the law, nor in the Department of Public Utilities, nor in the managements themselves is there a clear conception of the purpose of a municipal electric plant. It is held that it is to supply electricity, of course, but under conditions which may make for

arrested development, or restricted service, or high rates. For instance, it is often held that a municipal plant should not sell or rent electrical appliances, or maintain appliances in an operating condition, even though such practices would result in increased output and lowered rates, because thus the plant would be brought into competition with merchants or artisans engaged in similar activities. Or it is held that the principal function of a municipal plant is to charge a high rate for electricity in order to collect a surplus to be devoted to reducing the tax rate, even though the performance denies the public the convenience of cheap electricity. Nowhere is there a clear statement that the purpose of a municipal electric plant is to furnish the maximum service at a minimum cost. In fact, an intent to the contrary can be read into one of the shambling sections of the 40 year old law.

The provision for a board of direction for the plants is especially incomplete. A town may elect a municipal light board to serve as directors of the plant, but it need not, and, if it does not do so, direction is left in the hands of the political administration of the municipality. Even if a municipal light board is elected, no special qualification for membership is required. A member may be an electrical contractor whose business would suffer if the plant were progressively managed, or he may be a salesman whose business depends on the good will of the companies. He may even be an official of an electric company which is selling electricity to the plant, or engaged in secret maneuvers to buy it out.

Inadequate as the law has become through neglect, it has been made worse by casual tinkering at inexperienced hands. One of the most dangerous instances is a recent amendment which vitiates the statute conferring responsibility on the manager, already noted as one of the distinctive merits of the old law.

Formerly all bills chargeable to the plant were payable by the town treasurer on requisition by the manager or the municipal light board. Now the auditor of a city or the selectmen of a town must approve all bills before they can be paid, and these officials are authorized to withhold payment of any bills which are in their opinion "excessive". So far the officials have taken their new responsibilities with a rubber stamp, but the opportunity for complete political control—over payrolls, supplies, and every kind of expense—is at hand for any administration which may be inspired to run, or to wreck, the plant.

If political interference with the policy or direction of the plants is given as one of the forces which menace the future of municipal operation, it should be understood that it is not a separate entity but rather a corollary either to inadequacy of the law or hostility of electric companies. Until recent years political interference has been a negligible factor, but lately it has assumed considerable importance. There is a growing tendency, all through the State, to require plants to collect from their customers more than the amount required for the plant, and to turn the surplus over to the town for tax relief. This requirement can be enforced through the weakness of the law.

According to the law, surplus earnings are available to finance additions to the plant only if they are appropriated to that purpose by vote of the town. If the town fails to appropriate the surplus to the construction fund, it automatically reverts to the town treasurer for general use. Or if a town's appro-

priating vote is so worded that the surplus is appropriated to the construction fund only after a specified amount has been paid over to the town, the manager must acquire a surplus in excess of the specified payment or have no surplus earnings for the regular additions and improvements which the development of the business requires. It is useless for the management to stand on its right to fix rates which will yield no surplus and have recourse to a bond issue for construction funds because the law requires the vote of the town to authorize bonds even though they must be paid from the income of the plant. Over the financial policy of the plant the management has no control.

Prior to the beginning of the depression only four plants were making payments to the town: two of them paying the equivalent of a local property tax, and two operating with an obvious eye to the tax rate. By 1930, 10 plants were making payments to the town; by 1932 there were 20; some of them turning over as much as 25 cents from each dollar of income—an equivalent to an overcharge of three cents in the highest block of a stepped rate.[3]

If this practice should subside to the payment of an equivalent to a local property tax, little permanent harm will be done. But the plants have a monopoly of what is today considered a necessity of life, and an indirect tax has a lively appeal to the politician. To such men it may seem that the possible revenue from a hidden tax on electricity is inexhaustible, but, as no municipal plant can hope to survive unless it can maintain lower rates than those of contiguous electric companies, the whole venture in municipal ownership may be lost through an attempt to apply the business principle of "what the traffic will bear."

This consideration gives rise to an interesting speculation. Are those who advocate mulcting the consumer for the benefit of the taxpayer animated by a zeal for public service, or are they animated by opposition to municipal ownership?

The hostility of the electric industry to municipal plants has been so generally displayed and carried to such silly extremes that evidence of its existence is not required here. If this hostility has been rated second to political interference in its menace to municipal operation, it is only because so far as this antagonism has been discerned it has had a less marked effect.

Its only direct and general interference with the municipal plants of Massachusetts occurred in the early twenties when the plants first became able as a whole to undersell the companies by a substantial amount. Through personal contacts with the management of municipal plants the companies induced them to keep their rates at the level maintained by the companies, and for a number of years municipal rates were unusually high. But aside from concealing the ability of the plants and postponing the era of cheap electricity, the practice did little harm. High rates meant large surpluses, and, as the practice of turning over surplus earnings to the towns had not been established, they were invested in income-producing additions which made the plants still more able to undersell dividend-burdened companies.

The period of sustained rates ended by accident in 1927. One of the antique provisions of the law limits surplus earnings to 8% of the cost of the prop-

[3] Illustration of a stepped rate:
First 20 units a month at 5 cents
Next 80 units a month at 3 cents
Next 100 units a month at 2 cents
All the rest at 1 cent.

erty. The sustained rates were yielding from 10 to 20%. This fact, as revealed in the annual reports of the plants to the Department of Public Utilities, was called to the attention of the Department in 1926, together with a statute which authorized it to petition the court to order the manager of a plant to comply with the law.

The Chairman of the Department decided that the statute was not mandatory, evolved a theory that lowered tax rates were preferable to low rates for electricity, and declined to interfere. But it happened that a studious journalist had been looking into the question of public ownership, and when one of the metropolitan newspapers[4] carried the front page news that municipal plants were sustaining rates in violation of the law and were in a position to supply their customers at half the rates charged by the companies, the public took notice.

Thereafter, the influence of the companies was unavailing. Rates dropped below the prevailing level and have stayed below ever since. In fact, they have become so low that the Department of Public Utilities has lately taken to pointing to municipal rates as evidence of what can be done and what the companies must do if they are to justify the principles of private ownership.

Such an argument is exactly what the companies feared and strove with shortsighted directness to prevent. That they failed does not mean that their cause is lost; it merely indicates recourse to subtler and more effective methods. The hostility of their closely organized industry with its overwhelming financial weight may become the controlling factor in the future of municipal operation.

[4] Louis M. Lyons, *The Boston Globe*, January 7, 1927.

Hostility can move in various hidden ways to cripple municipal operation. A few words tucked strategically into the law, or an inconspicuous determination by the Department of Public Utilities—all in the interest of lower rates to the public and with the hand of the companies nowhere in evidence—may result in sustained rates or impaired service to the extent necessary to neutralize the superiority of municipal operation which exists at the present time.

This consideration, like every other relating to the dangers surrounding the venture in municipal operation, leads to the question, how can hostile forces be effective in the face of the evident achievements of municipal plants?

Forty-nine municipalities in the State are supplied by municipal plants and all these cities and towns are represented in the Legislature. One customer in every 10 throughout the State is served by a municipal plant, and the other nine are not too favorably impressed with the general conduct of the electric industry. Then why doesn't the municipal electric movement get whatever legislation it wants; why doesn't it have representation on the Department of Public Utilities; why isn't it the leader in public thought that it is in the public service?

The question can almost be answered by pursuing it farther. Why is every municipal plant referred to as "the electric company" by the man in the street; why are three of its customers out of five unaware that their electricity is being supplied by the municipality; and why is the public at large unaware that municipal electric plants have been in extensive operation for 40 years?

The failure of municipal managers to develop an organization working in their common interest has long been the

despair of those concerned with the future of the venture—an organization which would retain legal and technical assistance for the common cause, which would exchange information and experience, and would give the public at least a chance to learn what is being accomplished. The fact that there is no legislation authorizing the support of such an organization merely begs the question. The real answer lies in the provincialism, the timidity, and the high principles of the managers themselves.

Most of the men have grown up with their plants and can look back to the time when they worked on them with their own hands. They are still overworked, and thanks to the public's regard for its servants, they are paid perhaps twice as much as first class stenographers. It is not surprising therefore to find them occupied with the details of the immediate job, and to find every student of Massachussetts' venture in municipal ownership noting a certain provincialism in the managements of the plants.

And if the managers are timid about anything more than minding the immediate job in silence, the reason is not hard to find. By the public they are regarded as mere heads of departments, and they feel that any attempt to popularize the business of the municipal plant would be construed as an attempt to exalt their own position—to play politics. Also, with the electric industry bent on suppressing news of the achievements of public ownership, and with employees and officials of the electric companies occupying town offices and sometimes even appearing on the municipal light boards, it is probable that the manager will keep to an inconspicuous role.

Furthermore, an inarticulate idealism characterizes the group of men who manage the plants. A feeling prevails that as public servants it becomes them to carry on their work under such conditions as the public provides; to avoid the employment of legislative counsel, and abide by what laws are in force rather than seek to influence legislation.

However commendable such an attitude may be in an individual, for an industry in the position of the municipal electric plants it is little more than sophistry and a weakness which may lead to disaster.

IV. Conclusion

In the 40 years of their operation the municipal electric plants of Massachusetts have not only demonstrated the general proposition that public ownership may be as effective as private ownership, but they have made two particular demonstrations of singular importance for the future. The first concerns the remarkable capability of electric plants of moderate size.

At the present time no electrical undertaking in the State, whether privately or publicly owned, offers better residential rates than some municipal plants which supply populations of from 10,000 to 20,000. Such plants have established stepped rates which enable 600 units a month to be bought at an average rate of 2⅓ cents, and one of them has recently set a new low average very close to 1½ cents. Moreover, the ability to offer such a rate is independent of whether the supply of electricity is purchased in bulk from some outside source or generated by the municipality in a small fuel-burning power station of its own.

The criticism that such plants are unimportant because they are relatively small fails to grasp the profound significance of their achievement. What it means can be realized from the fact

that most municipalities, even those included in the areas supplied by large companies or "chains", have a moderate population. These small plants have shown that cheap electricity is not dependent on superpower projects, transmission lines, proximity to coal, oil, or some exceptional source of water power, but can be secured by any municipality larger than a village which is able to operate its own electric plant.

But the most important contribution of the Massachusetts experience to the philosophy of public ownership, at a time when the movement is receiving unprecedented encouragement, is the demonstration that the success of municipal electric plants is largely dependent on the provisions of their charter. In whatever provisions the Massachusetts law has been specific and mandatory, and has provided responsibility for enforcement and penalties for violation, it has been observed. Every plant fixes its rates to earn all operating expenses, provide for depreciation, and retire its debt. Every plant keeps its accounts and makes its reports as the law requires. Only where the law is vague or incomplete, or where no one is charged with its enforcement do mismanagement and political direction creep in.

Municipal operation is not a royal road to the service of the public; there is nothing inherent in it which will compensate for poor management; but good management comes in about the measure that is required by the organic law.

The Weak-and-Strong-Road Problem

By D. PHILIP LOCKLIN

IT HAS long been recognized that the fair-return-on-fair-value doctrine is impossible of application to individual railroads. This is because a level of rates adequate for one railroad is excessive for another, and entirely inadequate for a third. Yet uniform rates must be maintained on competing lines. Even if railroads were arranged in regional groups, with each system having a monopoly in the territory it served, difficulties would be encountered in attempting to maintain a different rate level on each system. To be sure, some differences in the rate level could be maintained, but the tendency for industry and agriculture to thrive in regions of lower rates and to develop more slowly or even to decline in areas having higher rates might easily defeat their purpose. This situation is aggravated by the fact that differences in unit costs of operation are often attributable to differences in traffic density. High rates tend to reduce volume of traffic and increase unit costs.

The situation described above creates the weak-and-strong-road problem. The problem has been recognized for a long time but a complete solution has not been offered, if indeed any is available. The matter attracted considerable attention in 1919 and 1920 when it was apparent that the very existence of many short lines was threatened. The problem has received little attention recently, partly because it has been eclipsed by the more pressing question of how to rehabilitate the earning power of all railways. The problem of the weak lines, however, has not been solved, and will arise to plague us again when the problem of railway earnings as a whole has been solved.

Since the weak-and-strong-road problem arises from the necessity of considering railroads as a whole in fixing rates, it may be well to point out that this situation was presented to the Interstate Commerce Commission in numerous rate cases many years ago. In considering rates on grain in Trunk-Line Territory in 1903, the Commission decided to determine the reasonableness of the rates with reference to the two great railway systems between the east and the west—the New York Central and the Pennsylvania.[1] This was thought to be fair to the Baltimore & Ohio also. The situation was again before the Commission in 1909, when considering rates from St. Paul to the Pacific Coast. The Commission refused to fix rates by considering either the strongest or the weakest routes alone and held that the roads must be considered as a whole.[2] A similar policy has been followed in other cases, some of which concerned particular rates, and others the general rate level.[3] The policy of considering railroads as a whole in fixing rates received Congressional sanction in 1920. Section 15a of the Transportation Act provided that the Commission should prescribe

[1] *Re Proposed Advances in Freight Rates*, 9 I. C. C. 382, 426 (1903).

[2] *City of Spokane v. Northern Pacific Ry. Co.*, 15 I. C. C. 376, 392 (1909).

[3] *Kindel v. New York, New Haven & Hartford R. R. Co.*, 15 I. C. C. 555, 563 (1909); *Receivers & Shippers Assoc. v. Cincinnati, New Orleans & Texas Pacific Ry. Co.*, 18 I. C. C. 440, 464 (1910); *Newport Mining Co. v. Chicago & North Western Ry. Co.*, 33 I. C. C. 646, 656 (1915); *Advances in Rates, Eastern Case*, 20 I. C. C. 243, 274 (1911).

rates which would give the carriers as a whole, or as a whole in such rate groups as the Commission should prescribe, a fair return upon the aggregate value of their properties.[4]

Objections to the Use of Group Values

A few writers insist that the group system is wrong and that rates should be high enough on each line to support it. From an economic point of view this would be very desirable, if at all practicable. Every system of transportation ought to pay its way. Shippers located in regions where transportation costs are high should pay for the transportation which they demand. It often seems unfair for shippers located in more advantageous locations to pay high rates to support lines they do not use. Uneconomical and wasteful transportation is encouraged if shippers situated in unfavorable locations are relieved of paying the full cost of the transportation service supplied to them. Conversely, profitable and desirable geographical division of labor is prevented by exacting higher rates on favored lines than the cost of performing the service.[5]

We must conclude that it would be highly desirable to have a different level of rates on every line of railroad if that were necessary to enable each to earn a fair return. But if this were possible there would be no weak-and-strong-road problem of consequence. It is just because this method of adjusting rates is impossible that our problem exists. We must admit, however, that in so far as it is possible, higher rates should be maintained where costs of operation are higher. The Interstate Commerce Commission recognizes this and has often prescribed higher rates in certain areas or on lines having more difficult operating conditions or lighter traffic density. On this basis, also, the Commission has permitted "arbitraries" or differentials on short and weak lines.

Discriminatory Rates

A related method of dealing with this problem is to permit high-cost lines to charge high rates where they can obtain them, and then permit them to charge lower rates where necessary to meet the competition of lines maintaining a lower scale of rates. This is very frequently done, but not always in a conscious effort to aid the weaker lines at the expense of the stronger. Illustrations may be found in granting relief from the long-and-short-haul clause to weak lines in order that they may compete at through points with stronger lines without a corresponding reduction in local rates. A similar result follows from the common practice of permitting circuitous lines to meet the rates of more direct lines at competitive points without reducing rates at intermediate points on the circuitous lines. This practice permits circuitous lines to participate in competitive traffic which would ordinarily move over more direct routes. It aids the circuitous line at the expense of the direct. The practice of granting railroads fourth-section relief to meet market competition or the competition of cheaper forms of transportation has a similar equalizing effect. So also does the practice of considering competition as a justification for discriminations that would otherwise fall under the prohibitions of Section 3 of

[4] Section 15a, as modified by the Emergency Transportation Act of 1933, makes no mention of a rate-base, but this in no sense removes the necessity of considering railroads as a whole or in groups when prescribing a rate level.

[5] This point of view is well set forth in Brown, H. G., "Railroad Valuation and Rate Regulation", 33 *Journal of Political Economy* 505, 522-529 (1925). It is also the view asserted by Haney, L. H., "Advantages and Disadvantages of Railway Consolidation", 14 *American Economic Review* (Supplement) 88 at 90 (1924).

the Interstate Commerce Act. An undesirable consequence of these practices is that they lead to wasteful transportation and economic loss to society.

Division of Joint Rates

Another method of aiding weak lines is through the division of joint rates. This method of dealing with the problem was incorporated into the Transportation Act of 1920.

Paragraph 6 of Section 15 of the Interstate Commerce Act empowers the Commission, in dividing joint rates between participating carriers, to take into consideration the revenue needs of the lines concerned. This power was exercised by the Commission in 1922 when it held that the carriers in New England were entitled to an increase of 15% in the divisions they received on traffic moving into and out of New England from the West and South.[6] The increase was granted largely on the basis of the need of the New England carriers for additional revenues.

The close relation between this provision of the law and the system of basing rates on aggregate property values is clearly revealed by the circumstances of the above case. In *Increased Rates, 1920*,[7] the Commission increased freight rates in Eastern Territory by 40%. At that time it was estimated that an increase of about 47% would have been necessary to give the New England carriers a fair return, while an increase of about 28% would have been sufficient for the carriers in Trunk-Line Territory, and an increase of 24% for the carriers in Central Freight Association Territory. There was danger, however, that higher rates in New England would have an unfavorable effect upon the volume of traffic in that area. The Commission accordingly grouped together the carriers in the three territories and granted a 40% increase in rates. The proceeding in the New England Divisions case might therefore be deemed as supplementary to the Commission's action in *Increased Rates, 1920*, for it divided carrier revenues in such a way that the carriers which needed the larger share of the proceeds would get it.

This action of the Commission was contested in the courts, but the United States Supreme Court upheld the Commission's action. The Court took particular pains to point out that the division of rates according to revenue needs was not "a partition of property." "It is not true, as argued, that the order compels the strong railroads to support the weak. No part of the revenues needed by the New England lines is paid by the western carriers. All is paid by the community pursuant to the single rate increase ordered in *Ex Parte 74*."[8] Throughout the decision the Supreme Court recognized the relation between the practice of making rates on the basis of aggregate property values of groups of carriers and the division of these rates according to revenue needs. Mention was made of the fact that the people would not tolerate greatly increased rates, although no higher than necessary to support the weak lines, if prosperous lines were thereby allowed to earn unreasonably large returns. "The provision concerning divisions was, therefore, an integral part of the machinery for distributing the funds expected to be raised by the new rate-fixing sections. It was, indeed, indispensable."[9]

Since 1920 this provision of the law

[6] *New England Divisions*, 66 I. C. C. 196 (1922).

[7] 58 I. C. C. 220.

[8] *New England Divisions Case*, 261 U. S. 184, 196 (1923).

[9] *Ibid.*, p. 191.

has been used many times in aid of weak railroads, particularly of the short-line roads. The Commission does not consider revenue needs the sole factor in determining how joint rates should be divided, and it has often said that the fact that a carrier is being operated at a loss is not of itself sufficient ground on which to order an increase in divisions.[10]

Although the power to divide joint rates somewhat according to revenue needs is a useful method of distributing earnings which are fair to the carriers in the aggregate, it is subject to certain limitations which restrict its ability to cope with the problem alone. (1) The power is limited, and quite properly so, by the necessity of leaving non-confiscatory divisions to connecting carriers.[11] (2) The efficacy of divisions as a means of aiding weak railroads further depends upon the existence of a substantial amount of traffic interchange. The device cannot be used to equalize between more or less parallel lines, nor between connecting lines with little traffic to interchange. (3) A third limitation upon the effectiveness of divisions as a solution of the weak-and-strong-road problem rises from a hesitancy on the part of short and weak lines to take any action which would offend their strong connections on whom they are often dependent for favors of one sort or another. (4) Another limitation arises from the possibility that a carrier deprived of its accustomed share of a through rate may defeat the Commission's order. It may induce shippers to route their traffic over routes which do not necessitate use of the weak line. This is possible, of course, only when alternative routes which do not require use of the weak line are available. (5) Still another circumstance which restricts the usefulness of this device is the possibility of closing through routes. If a weak line is granted a larger share of the through rate than its connections are willing to concede, the through route over which the joint rate is applicable may be closed, and possibly another route established which does not require the use of the weak road. Although the Commission has power to establish through routes and joint rates and to prevent the closing of old ones, the power cannot be exercised in such manner that it deprives a participating carrier of the longest haul possible over its own lines, except when such route is unreasonably circuitous. The right of a carrier to the long haul is specifically reserved by paragraph 4 of Section 15. This section provides that in establishing a through route

> "the Commission shall not . . . require any carrier, without its consent, to embrace in such route substantially less than the entire length of its railroad . . . which lies between the termini of such proposed through route, unless such inclusion of lines would make the through route unreasonably long as compared with another practicable through route which could otherwise be established."

If the Commission grants increased divisions to a weak line, connecting carriers, if short-hauled, may exercise their privilege of closing the route.

The Recapture Clause

Another method of dealing with the weak-road problem is through recovery by the government of excess earnings of strong lines for the benefit of the weak. This method of dealing with the problem was incorporated into the Transportation Act of 1920 in the so-called "Recapture Clause", which has since been repealed. The Recapture Clause, it will

[10] *Murray, Receiver, v. Erie R. R. Co.*, 95 I. C. C. 13, 18 (1924).

[11] *United States v. Abilene & Southern Ry. Co.*, 265 U. S. 274, 285 (1924).

be recalled, required carriers earning more than 6% on the value of their properties to pay ½ of the excess to the government. This was to go into a fund maintained by the Interstate Commerce Commission from which loans might be made to needy railroads.

The Recapture Clause was attacked by the railroads as unconstitutional but it was upheld by the United States Supreme Court in *Dayton-Goose Creek Ry. Co.* v. *United States*.[12] Here again the Court called attention to the group value system of determining rates and the necessity of supporting all railroads in the group.

"By the recapture clauses Congress is enabled to maintain uniform rates for all shippers and yet keep the net return of railways, whether strong or weak, to the varying percentages which are fair respectively for them. The recapture clauses are thus the key provisions of the whole plan."[13]

Elsewhere in the same case the Court said:

"The combination of uniform rates with the recapture clauses is necessary to the better development of the country's interstate transportation system as Congress has planned it. The control of the excess profit due to the level of the whole body of rates is the heart of the plan."[14]

The Court was not impressed by the contention that railroads were entitled to all they could earn under a level of rates prescribed by the Commission.

"The carrier owning and operating a railroad, however strong financially, however economical in its facilities, or favorably situated as to traffic, is not entitled as of constitutional right to more than a fair net operating income upon the value of its properties which are being devoted to transportation. By investment in a business dedicated to the public service the owner must recognize that, as compared with investment in private business, he cannot expect either high or speculative dividends but that his obligation limits him to only a fair or reasonable profit."[15]

The right of the government to reduce the rates on a particular line when the carrier is earning more than a fair return would be generally acknowledged. The Recapture Clause attempted to accomplish the same result indirectly, by permitting a higher level of rates than strong carriers needed and then taking a part of the excess earnings.

The argument was also made in the Dayton-Goose Creek case that, if a railroad was entitled only to a fair return, then the shippers using the road ought not to be compelled to pay higher rates than were necessary to give the road such a return. The Court did not accept this view. The rates are reasonable from the standpoint of the shipper though their net product provides more than a fair return for a particular carrier.

"Rates which as a body enable all the railroads necessary to do the business of a rate territory or section, to enjoy not more than a fair net operating income on the aggregate value of their properties therein economically and efficiently operated, are reasonable from the standpoint of the individual shipper in that section."[16]

This is because every shipper is interested in an adequate *system* of transportation which will serve the whole area or country. "He may, therefore, properly be required in the rates he pays to share with all other shippers of the same section the burden of maintaining an adequate railway capacity to do their business."[17]

The recapture provisions were frequently criticized on the ground of alleged injustice to the stronger lines

[12] 263 U. S. 456 (1924).
[13] *Ibid.*, p. 480.
[14] *Ibid.*, p. 485.
[15] *Ibid.*, p. 481.
[16] *Ibid.*, p. 480.
[17] *Ibid.*

which would be deprived of the advantage of their superior location.[18] This argument failed to recognize the well established rule that it is legitimate and proper to limit a carrier's return to a fair return. The argument also failed to recognize that the aggregate-return-on-aggregate-value method of rate-making, prescribed by the Act of 1920, raises the level of rates on the stronger properties above what they could demand under the *Smyth* v. *Ames* rule. In effect, the group-value system enables the stronger lines to earn a return on the values of the weaker roads which are not able to earn a fair return on their own property.

There was another objection to the recapture provisions which we cannot consider as justified. It was often pointed out that many lines which were strong financially were not subject to the recapture clause. A conservative capitalization made these railroads strong although their earnings were moderate when related to their value. On the other hand, there were many weak railroads which were weak because of excessive capitalization. The earnings of these lines, when related to the value of their properties, might be generous, but their credit was poor none the less. Because of this situation it was argued that the Recapture Clause did not take from the strong, but often took from the weak, instead.[19] The argument is not sound. It cannot be successfully contended that the credit of the overcapitalized roads should be bolstered up by loans or that the conservatively capitalized roads should be penalized for their conservative financial policy. There are other remedies for financial weakness which is attributable to overcapitalization. Recapture was never intended and could not equitably be expected to remove this source of weakness.

Notwithstanding the logic of some sort of recapture provisions to distribute earnings accruing from uniform rates, the recapture provisions of the Transportation Act failed miserably to accomplish the purpose for which they were devised, and they were retroactively repealed by the Emergency Railroad Transportation Act of 1933. The weaknesses of the Recapture Clause have been generally recognized and do not require extended discussion. Briefly, these weaknesses were (1) the fact that only half the excess earnings were recovered, although to have taken all would have removed any incentive to efficient operation; (2) the terms and conditions under which the loans were to be made were not attractive and would have prevented the use of the fund in the manner contemplated; (3) loaning money to weak lines is a dubious form of relief; (4) no averaging of earnings from year to year was possible to permit the deficiencies in earnings of one year to balance excess earnings of other years; (5) the administration of the clause was difficult because the "value" of the property had to be ascertained, thus injecting the whole valuation controversy into the administration of the section.[20]

Consolidation

Another method of dealing with the weak road problem—one also provided

[18] E. g., see statement of John E. Benton in *Hearings before House Committee on Interstate & Foreign Commerce*, 72d Cong., 1st sess. on H. R. 7116 & 7117—*Railroad Legislation* (1931), pp. 140-141.

[19] This argument was suggested by Commissioner Eastman in *Hearings on H. R. 7116 & 7117* (1932), p. 10; and by H. G. Moulton in *The American Transportation Problem* (Washington: The Brookings Institution, 1933), pp. 379-380.

[20] These weaknesses are explained more fully in D. P. Locklin, "Railroad Legislation of 1933", 10 *Journal of Land & Public Utility Economics* 13 (1934).

by the Transportation Act of 1920—was railroad consolidation. Here, in the estimation of Congress, lay the ultimate solution of the problem. The Recapture Clause and the provisions regarding the division of joint rates were temporary measures and would become unnecessary when the consolidation of railroads into a limited number of well balanced systems of equal earning power was accomplished. The elaborate provisions of the law relating to consolidation were framed with the definite object of solving this problem.[21] The purpose is clearly revealed in the instructions to the Commission regarding the making of a plan of consolidation. The Commission was directed to establish systems such that under a uniform level of rates each system would be able to earn approximately the same rate of return upon the value of its property.

Railroad consolidation was supposed to eliminate the weak-and-strong-road problem in two ways. First, a combination of weak roads with the strong would eliminate, or at least obscure, the inherent weakness of certain lines. Thus the weak lines would be aided by the superior credit of the stronger, and would in part be supported by the earnings of the stronger. Secondly, it would be possible, in some cases, to build up strong systems by the combination of smaller lines. This is because many weak lines serve small areas, or lack access to important points of traffic interchange or points at which traffic originates. Too often this factor is overlooked and consolidation is considered as contributing to the solution of the weak-and-strong-road problem only through saddling weak and unprosperous lines upon the stronger.

Consolidation as a solution of the problem of weak railroads has been severely criticized. Some of the more important objections require consideration. (1) One objection has been voiced by Professor Daggett.[22] His contention is that consolidation remedies no injustice since there is no equalization between the shareholders of the weak and strong roads. He admits that railroads may be combined in such a way that each earns approximately the same rate of return, but consolidation "does not equalize . . . between the human owners of companies."[23] This is because the normal basis for voluntary merger is earning power. If shares in a newly organized corporation are exchanged for the shares of the consolidating corporations, they will normally be exchanged in proportion to the earnings contributed by each company to the joint undertaking. The shareholders of the weaker company are therefore in no better position than they were before the consolidation. If earnings are distributed after consolidation in the same manner as before, no injustice has been remedied.

The equalization between the stockholders of the consolidating corporations has much to commend it whenever this can be done without treating unfairly the stockholders of the stronger line, but it may be very seriously questioned whether Congress had any intention of equalizing returns between the owners of weak and strong roads rather than between the companies created by consolidation, nor is there any necessity of equalizing between the stockholders.

[21] For evidence of this purpose see MacVeagh, Rogers, *The Transportation Act, 1920* (New York: Holt, 1923), pp. 275-283; and Cummins, Albert B., "The Senate Committee Railroad Bill", 8 *Proceedings of the Academy of Political Science* 518 at 520-521 (1919).

[22] See *Principles of Inland Transportation* (New York: Harper & Brothers, 1928), pp. 462-463; and "Railroad Consolidation West of the Mississippi River," 11 *University of California Publications in Economics* 127 at 251-252 (1933).

[23] *Principles of Inland Transportation*, p. 462.

If the weak-and-strong-road problem is considered as one of preserving the existence of weaker lines, it can be seen that equalization between the former stockholders of the consolidating roads is not essential. Investors in the weaker line simply take a loss when they sell their property at its commercial value, but the road continues in existence as a part of a larger system. If the problem is regarded as one of creating systems of equal earning power in order to facilitate rate-making, it will again be seen that equalization between systems is the essential thing.

(2) A second criticism of consolidation as a solution of the weak-road problem is that it is merely a device to preserve lines which cannot pay their own way and which ought to be abandoned. H. G. Brown has voiced this objection thus:

> "Any scheme of consolidation of the 'strong' and the 'weak' roads advocated on the assumption that higher earnings of the 'strong' part of the consolidation are going to offset lower earnings of the 'weak' part so as to permit low rates on the latter, is a scheme for an indirect bounty from the more favored regions to encourage the business development of the less favored . . ."[24]

Unfortunately consolidation might have this effect, but such a result is neither necessary nor desirable, and every effort should be made to prevent it. Railroads which have no economic justification should not be consolidated with stronger lines, but should be abandoned. Furthermore, as pointed out earlier in the chapter, it is highly desirable to have higher rates on weaker and less favorably situated lines wherever this is possible. This should be done to avoid the charge that the shippers in favorably located regions are subsidizing industry in less favored areas. In so far as this is not possible, it may be true that one group of shippers is subsidizing another, but here the statement of the Supreme Court in the Dayton-Goose Creek case should be recalled. Rates high enough to support an adequate system of transportation may reasonably be imposed upon shippers. The shipper located on a favorably situated line is interested in having an adequate transportation system and may therefore be required to pay rates high enough to support the weaker lines as well as the stronger.

(3) The foregoing criticism of consolidation as a solution of the problem under consideration was based on the assumption that the burden of supporting the weak part of a consolidated system would be shifted to the shippers located on the stronger portions. Another criticism of consolidation assumes that the burden of supporting the weak lines is thrown upon the stockholders of the stronger. The contention is made that it would be unfair to those who have invested their funds in prosperous lines to be compelled to support the weaker lines through a diversion of funds to the former stockholders of the weak lines. The assumption that the earnings of investors in strong lines would be diluted is implied in the common argument that consolidation would drag down the stronger lines and weaken their credit, or that it is unfair to saddle the weak lines upon the stronger.

If consolidation proceeded along the lines suggested by Professor Daggett, that is, if the weaker road got no larger share of the joint earnings after consolidation than before, clearly the absorption of the weak railroads by the strong would not burden the stronger lines or their stockholders. If the weak line was taken in on the basis of its commercial value—that is, the capital-

[24] *Op. cit.*, at 523.

ized value of its expected earnings if it were operated independently—clearly no financial burden would be placed upon the strong.

Even if the strong railroad pays more for the weak line than its commercial value it does not necessarily result in diverting funds from the stockholders of the stronger to stockholders of the weaker line. This is because the inclusion of the weak line in the rate-base results in higher rates than the strong line would be entitled to demand by itself. Therefore, use of the increased receipts to support the weaker lines is no more of an appropriation of funds equitably belonging to the stockholders of the strong than was the recapture of excess earnings under the Recapture Clause, or the division of joint rates according to revenue needs as was done in the New England Divisions case. The principle is the same in all three instances. Earnings accruing to a strong line solely because the value of the weak line is included in the rate-base are distributed to the lines which cannot charge higher rates. The strong are deprived of nothing to which they can justly lay claim.

It is possible that weak railroads may be purchased at too high a price. This would throw a burden on the stronger lines, or divert funds from their stockholders to stockholders of the weaker line. This may have occurred, for instance, when the New York Central was required to take over certain short lines in the territory which it serves.[25] The terms demanded by weak lines in such cases should be carefully scrutinized.

Our conclusion on this point, therefore, is that consolidation of the weak with the strong roads does not necessarily weaken the strong or work an injustice to the stockholders of the strong. It does not do so when the weak line is taken in on the basis of its commercial value, and it may not work an injustice even when more than commercial value is paid. This is because the inclusion of the weak line in the rate-base has raised the rate level above what it would have been if the strong line alone were considered. No consolidation of weak with the strong should be permitted to take place on such terms that the weak line constitutes a drain upon the resources of the stronger.

(4) A fourth objection to consolidation as a remedy for the weak-road problem is that it does not cure but merely obscures weakness.[26] Thus some roads are weak because of poor management. Here the remedy does not lie in consolidation, but in improved management. Other railroads are weak because of a poor financial structure. Where this is so, the remedy lies in a reorganization or readjustment of the financial structure. In some cases financial weakness may be traceable to the fact that a line has outlived its usefulness because of the exhaustion of natural resources or the decline of industries or communities which it served. Abandonment is the remedy in such a situation. Sometimes weakness is to be explained by lack of terminal facilities. In this situation the remedy may consist of opening the terminals of other lines to the use of the weaker road. Weakness may be attributable to overbuilding and the construction of too many lines. Here again, abandonment of the weaker lines may be desirable.

[25] See minority opinions in *New York Central Acquisition of Boyne City, Gaylord & Alpena R. R.*, 180 I. C. C. 538 (1932); and *New York Central Acquisition of Chicago, Attica & Southern R. R. Co.*, 187 I. C. C. 527 (1932).

[26] This argument is used in Splawn, W. M. W., *The Consolidation of Railroads* (New York: Macmillan Co., 1925), pp. 244-247; and in Haney, *op. cit.*, pp. 89-92.

We find no fault with this argument against consolidation as far as it goes. Consolidation is not a cure-all for every kind of weakness. It is important that causes of weakness be ascertained and the proper remedy applied whenever that is possible. But after all has been said and done, the fact remains that many lines are weak because they cannot charge higher rates than their competitors or their neighbors, and it does not seem equitable to base rates on the necessities of the weaker lines alone. When this situation exists, consolidation is an appropriate remedy.

(5) Finally, attempts to solve the weak-and-strong-road problem through consolidation are criticized on the ground that strength and weakness are often temporary situations. Weak roads have the habit of developing unexpected financial strength at times, and strong lines sometimes become weak. Even if railroads can be grouped into systems of equal earning power, there is no assurance that the situation would not change. In fact, inequality in earning power would be almost sure to develop. But the impossibility of obtaining complete and permanent equality in earning power between systems is no reason for refusing to bring about a greater degree of equality than now exists. It is easily possible to reduce the extremes and bring about greater equality through consolidation.

The consolidation and combination provisions of the Transportation Act of 1920 have been a disappointment to those who hoped to see the weak-and-strong-road problem solved in this manner. There has been no "consolidation" under the provisions of Section 5, paragraph 6. To be sure, a great deal of "acquisition of control" through lease and stock-ownership has taken place and many small lines, and a few large but weak roads, have come under the control of larger and stronger railways. But we are far from having accomplished the ideal set forth by the Act—a limited number of systems of approximately equal earning power.

It is generally conceded that either compulsion must be exercised or some inducement held out in order to obtain consolidation of the weak and strong roads. Opposition to taking over weak lines appeared at the hearings on the tentative plan of consolidation which preceded the formulation of the so-called "final plan." It may be well to consider the possibility of exercising compulsion or persuasion to bring about the desired consolidations.

Compulsory consolidation raises the question of constitutionality. The Transportation Act of 1920, as finally enacted, provided only for voluntary consolidation. The Senate, in the Cummins bill, had previously gone on record in favor of compulsory consolidation. Largely because of the belief that such a provision would be unconstitutional, the compulsory feature was eliminated in the conference bill which finally became the Transportation Act of 1920. Some writers, however, believe that compulsory consolidation would be constitutional.[27]

Congress believed that the provisions of the Recapture Clause would afford sufficient incentive to induce the stronger lines to take over the weak. It was felt that a railroad which was subject to the Recapture Clause would take over a weak carrier if it might thereby avoid recapture liability. To illustrate: Suppose Railroad A, having a rate-making value of $100,000,000 earns $8,000,000—8% upon the value of its property. Its

[27] Craven, Leslie, Appendix III in the report of the Federal Coordinator—*Regulation of Railroads*, 73d Cong., 2d sess., Senate Document No. 119 (1934).

earnings would be divided into three parts: $6,000,000 would be left undisturbed by the law, $1,000,000 would be payable to the government, and $1,000,000 would be impounded in a special reserve fund to be drawn upon only in years when the carrier failed to earn interest and dividends. Suppose Railroad B, also having a rate-making value of $100,000,000, is able to earn 3% upon the value of its property. If Railroads A and B should combine, the rate-making value would be $200,000,000. The earnings of the combined properties, assuming no economies were effected through consolidation, would be $11,000,000, or 5½% upon the value of the properties. By consolidating with B, Railroad A would not only obtain the income of B, but would retain the $1,000,000 formerly payable to the government under the Recapture Clause, and another $1,000,000 of its income would be freed from the restrictions imposed by the Recapture Clause upon the half of the excess earnings which a carrier was allowed to retain. Since Railroad B could be purchased at a figure substantially lower than its rate-making value, because of its low earning power, there would be ample opportunity for terms of consolidation to be worked out to the mutual advantage of the stockholders of both A and B. Here then was the incentive which was to overcome the natural reluctance of strong roads to take over weak ones. But the Recapture Clause did not result in any noticeable scramble for weak lines. In part, this was attributable to the ineffectiveness of the recapture provisions. In part, it was the result of the low earnings for the railways as a whole, so that few large lines had earnings subject to recapture. In part, also, it was caused by the fact that the stronger lines in building up their systems in earlier years had absorbed many weak lines and branch lines at figures less than their rate-making values, and so, although strong financially, had moderate earnings when they were related to rate-making values. The Recapture Clause thus proved ineffective as a stimulus to consolidation, and its repeal in 1933 has removed the possibility of its operating in the future as such an incentive.

One method of exerting pressure for the consolidation of the weak and the strong was made available under the Act of 1920 and is still available under that Act as modified in 1933. In authorizing combinations of carriers which the carriers themselves request, the Commission has power to attach terms and conditions. It may attach to its authorization the condition that a carrier take steps toward the absorption of such other lines as the Commission thinks should be included in its system. In the Nickel Plate unification case the Commission commented upon the failure of the carriers to make provision for small and weak lines: "Every applicant should assume the burden of making reasonable provision in its plan for the possible incorporation of every connecting short line now in operation in the territory covered or to be covered by the proposed grouping or unification."[28] In 1931 the Commission attached such a condition in authorizing the unification of a number of lines by the New York Central.[29] The power to attach such a condition has been upheld by the United States Supreme Court.[30]

Routing of Traffic

Still another possible way of helping weak lines is through the routing of

[28] 105 I. C. C. 425, 449 (1926).

[29] *New York Central Unification*, 150 I. C. C. 278 (1929); 154 I. C. C. 489 (1929).

[30] *New York Central Securities Corp. v. United States*, 287 U. S. 12 (1932).

traffic. This was contemplated in the Transportation Act of 1920. Section 15, paragraph 10, provided that

"With respect to traffic not routed by the shipper, the commission may, whenever the public interest and a fair distribution of the traffic require, direct the route which such traffic shall take after it arrives at the terminus of one carrier or at a junction point with another carrier, and is to be there delivered to another carrier."

This power has apparently not been exercised by the Commission. It is probable, furthermore, that any attempt to aid weak lines through routing unrouted traffic would end in failure. The Commission is empowered, under this section, to route only such traffic as is unrouted by the shipper. The carriers deprived of traffic by an order of the Commission could proceed at once to solicit shippers, asking them to route traffic over their lines.[31] This provision of the law is therefore not likely to prove of any help in the solution of the problem under consideration.

Pooling

Another method of dealing with the weak-and-strong-road problem has been suggested at various times. This is through pooling a portion of the receipts of the railroads, and distributing the pooled receipts among the weaker lines according to their needs. This plan was first suggested in 1925 by Mark W. Potter, formerly a member of the Interstate Commerce Commission and then one of the receivers of the Chicago, Milwaukee & St. Paul Railway Co. He proposed a moderate increase in rates in Western Territory, say 5%, with the proceeds of the increase to be pooled and distributed among the lines which did not earn a certain return.[32]

It is to be observed that this arrangement would not have equalized earnings, but would have prevented the stronger lines from receiving any benefits from the rate increase proposed and would have marshalled the proceeds of the increase for the benefit of the weaker lines. The "Potter Plan" was not adopted. In fact, it received very little serious consideration. A somewhat similar plan appeared in connection with the Fifteen Per Cent Case of 1931, and was supported on brief by the National Industrial Traffic League.[33] The Commission denied the carriers' request for a 15% increase in rates but permitted specific increases on a great many commodities. In its original decision in the case, the Commission attached the condition that the proceeds of the increase or "surcharge" should be pooled and distributed among the carriers which were not earning their fixed charges.[34] The railroads objected to the pooling arrangement. The Commission then modified its order and permitted the carriers to put into effect a modified plan which they had devised as a substitute.[35] The modified plan called for a segregation of the proceeds of the emergency increases, but provided that the funds so made available should not be given, but loaned, to the defaulting carriers. The Railroad Credit Corporation was created early in 1932 for the purpose of administering the plan. The loaning plan was discontinued on March 31, 1933.

Some question has been raised con-

[31] Vanderblue, H. B. and Burgess, K. F., *Railroads: Rates, Service, Management* (New York: Macmillan Co., 1923), pp. 270-271.

[32] *Memorandum on the Subject of Pooling a Portion of Receipts of Rail Carriers, etc.*, (1925). The plan is treated favorably in J. S. Eaton, "The St. Paul Plan of Rate Relief", 79 *Railway Age* 137 (1925), and critically by H. T. Newcomb, "The Potter Plan—a Critical Analysis", 27 *Annalist* 5 (1926).

[33] Brief before the I. C. C. in *Ex Parte No. 103* (1931).

[34] 178 I. C. C. 539 (1931).

[35] 179 I. C. C. 215 (1931).

cerning the power of the Commission to impose a pooling plan upon the carriers, and this was undoubtedly one reason for modification of the original order. As a means of relief to the weak line, however, the original plan of the Commission was superior to the loaning plan finally put into effect. The objection was raised to the Commission's original plan that it would take earnings of the strong lines and turn them over to the weak. This argument has no merit, for the plan was entirely in accord with the attitude taken by the United States Supreme Court in the New England Divisions case and in the Dayton-Goose Creek case. As Commissioner Eastman pointed out in his dissent from the action of the Commission which permitted the carriers to adopt the loaning plan, the New England Divisions case showed that the mere fact that a carrier collects certain revenue does not make it the owner, and that it may lawfully be required to turn over to another carrier a portion of that revenue to needy lines.[36] Or, as another writer has stated it, "The conception of earnings as a collection of monies for purposes designated by the Interstate Commerce Commission within the intent of the law has displaced the conception of absolute ownership by the individual carrier of such collections for account of revenue."[37] The emergency charges authorized by the Commission in 1931 were properly considered by it as a special tax upon the users of the railroads to prevent default of interest payments. It was logical that the proceeds be distributed in such manner as to accomplish the desired result.

It is submitted that a device similar to that proposed by the Commission in the Fifteen Per Cent Case of 1931 might be of considerable aid in the solution of the weak-and-strong-road problem. Such a plan, however, needs positive legislative sanction to remove doubts of its legality.

Conclusions

We are now in a position to state certain conclusions regarding the weak-and-strong-road problem. First, in so far as it is possible, the causes of weakness should be ascertained and removed. In many cases, however, the cause of weakness will simply be the impossibility of maintaining on each line the rate level necessary to give each a fair return. Where this situation is encountered, and the weak lines are not roads that should be abandoned, a number of devices mentioned in this article may be used to help the situation. Of these the division of joint rates, a system of pooling a portion of railway receipts (if such a plan is given legal status by statutory authorization), and a carefully planned system of consolidation seem to offer the greatest possibilities.

[36] 179 I. C. C. 215, 233 (1931).

[37] Eaton, *op. cit.*, p. 139.

Has Production Outrun Consuming Power?

By WILLFORD I. KING

PRESUMABLY the historian of the future will designate 1775 and 1933 as years marking the beginnings of economic revolutions in America. In the first of these revolutions mercantilism was overcome by laissez faire; in the second, laissez faire was overthrown by technocracy.

The revolution beginning in 1775 was a natural outgrowth of the fact that the leading emigrants to the American colonies were largely men who left Europe because they were galled by the rigid restrictions there imposed upon individual initiative and private enterprise. They and their sons and grandsons continued to resent the attempt of England to extend its system of planned economy to America. Freedom, liberty, and independence became the watchwords of the hour. These ideals were, of course, in direct conflict with the mercantilistic policy of having the government guide industry into carefully mapped paths. The enactment of the Navigation and Stamp Acts brought matters to a crisis. The fundamental issue underlying the American Revolution was whether the colonists should enjoy freedom of movement and untrammelled property rights, including freedom of inheritance and freedom of contract, the last mentioned prerogative meaning that they should have the right to buy and sell land, labor, and other commodities freely in the open market at the most advantageous prices obtainable.

These were the rights for which the colonists fought. It is, therefore, not surprising that, when the war was won, the 13 states proceeded to embody in their new Constitution the doctrine of laissez faire.

For a century or more, this principle, while often violated in practice, undoubtedly dominated the economic philosophy of the nation. After 1900 it was subjected to more attacks than previously but, nevertheless, it continued, until 1929, to be generally recognized by the majority of the American public as furnishing the only sound foundation for our economic life.

Then came the great crash. At first, despite the fact that it was wrecking fortunes by the tens of thousands, it did not seriously disturb the economic philosophy, even of the losers. When, however, 1931 and 1932 failed to bring the expected recovery, men everywhere began to inquire as to whether something was not radically wrong with the whole capitalistic, competitive system, and whether the defect did not inhere in the very foundation upon which it had been erected—namely, in laissez faire itself. With the public in this state of mind, all that was needed to crystallize the spirit of doubt into a spirit of conviction was leadership. This leadership was furnished by the technocrats.

The forces of the technocrats were soon augmented by powerful groups of neo-mercantilists. Among these were:

1. Those reformers who had long believed that free competition was inimical to the welfare of the common people, and that better results could be obtained by conscious planning of industry and regimentation of the inhabitants.

2. Leaders of great industries who were anxious to rid themselves of the obnoxious pack of small competitors

whose efficiency, and hence price-cutting propensity, was ever irritating and always tending to prevent the establishment of those monopoly prices which are necessary if gratifying returns are to be secured regularly.

The philosophy of technocracy, as modified to meet the requirements of the new allies of that system, may be said to comprise the following fundamental theses:

1. That, industrially, the nation must be regarded as being, in essence, a huge engineering project.

2. That the amount of energy available is limited, and that production is dependent upon the way in which this energy is expended.

3. That the use of this energy should be guided by technicians employed by the government.

4. That the energy available is sufficient, if properly directed, to furnish total production far in excess of any output which has yet been attained.

5. That the total demand of the public for goods is decidedly limited.

6. That the present depression was brought about by the fact that, in very many fields, the supply of goods had outrun the demand for such goods.

7. That the way to obtain recovery and to prevent future depressions is to collect the necessary statistics from the various fields, and, thereafter, in each field, to fit production to demand. To do this will, they believe, call for sharp curtailment of output in many lines.

In an incredibly short time this revised technocratic program captured the imagination of the populace. Within a few months the disciples of the new doctrine were actually administering the affairs of the nation from Washington. It is, however, one of the ironies of fate that, while the philosophy of technocracy was thus triumphing over all opposition, its high priest, Howard Scott, was passing into obscurity and, indeed,the very name, technocracy, was sinking into oblivion. The pioneer band of technocrats, like many an earlier group of reformers, was swallowed up in the avalanche which it had started.

The disappearance of the names of most of the original technocratic leaders from the headlines does not, however, indicate that the movement against laissez faire has been losing force. All that has happened is that the movement has been taken over by the New Dealers. One by one, property rights are being abrogated. Freedom of contract is disappearing. The right to buy and sell goods and services freely in the open market is being curtailed or abolished. Cartels and monopolies are taking the place of competitive enterprises. Last, and by no means least, the course of production is, to a large extent, being determined by the edicts of code authorities, planning boards, and government officials instead of by the dollar votes of the consumers of the products.

This economic revolution is so sweeping in its effects that it seems eminently worth while to examine in some detail the validity of the chief tenets of the victorious technocratic or New Deal philosophy. These tenets will be considered in the order in which they have just been enumerated. With the first two propositions—namely, that the nation must, logically, be thought of as a huge engineering project, and that the volume of production therein is dependent upon the effectiveness with which the limited available supply of energy is utilized—orthodox economists have no quarrel; in fact, these doctrines are implicit in the writings of most of this group.

When, however, the technocrats—or, in other words, the New Deal advocates

—go farther and demand that the control of industry be turned over to government officials and technicians, they, of course, oppose diametrically the whole philosophy of laissez faire as expounded by Adam Smith and reiterated by economists of the Classical School and their successors. In so far as the technocratic or New Deal doctrine has been translated into action, it means reversion to mercantilism of the seventeenth and eighteenth centuries. If carried to its logical conclusion, it means state socialism. In his pamphlet, *America Must Choose*, Henry Wallace, Secretary of Agriculture, asks each citizen to express his preference for one of these two goals. The objections to state interference in industry are set forth so clearly and forcefully in Adam Smith's *Wealth of Nations* that it is wholly unnecessary to repeat them here. The added experience of the last 150 years merely demonstrates the remarkable clarity of Smith's reasoning, and establishes the validity of most of his conclusions. So much for the first three of the technocratic or New Deal theses.

The fourth proposition of the technocrats—namely, that the energy now available needs only to be directed properly to give us production far in excess of anything known up to the present time—is much easier to set forth than to substantiate. Its proponents usually bolster up their case by citing examples of the tremendous volume of goods which one man, equipped with the most modern machinery, can turn out. What they omit to state is that to make the requisite machines and keep them repaired and supplied with power generally requires the services not of one but of a large group of men.

In addition, the technocrats overlook the fact that a large proportion of our industry is not now and is not likely to become highly mechanized. For example, barbers, tailors, waiters, restaurateurs, mercantile employees, physicians, lawyers, and millions of others engaged in serving the public directly, probably work but little more speedily or diligently than did their predecessors of a century or two ago. It is well to remember, also, that many human beings are naturally inefficient, and no mechanical system will overcome this defect. Furthermore, fires, floods, droughts, and pests frequently interfere with the even tenor of mechanistic processes.

The technocrats talk as if labor-saving devices were something new, totally ignoring the fact that, for a century, America has been famed for its marvelous inventions. No evidence has been presented to prove that the process of invention has recently been speeded up. The painstaking research conducted by Carl Snyder and his assistants at the Federal Reserve Bank of New York shows that, in the United States, total physical production has been increasing at a roughly constant proportional rate of nearly 4% per annum for well over a century. The best evidence indicates that the upward slope of this trend has not been accentuated materially, if at all, in recent years.[1] It follows that the

[1] Warren and Pearson, in *Prices* (New York: John Wiley & Sons, 1933), Fig. 38, show that, in the 20 years preceding the depression, "basic production" was increasing somewhat more slowly than in earlier years. On the contrary, Warren M. Persons' article in *Barron's*, May 15, 1933, p. 18, shows that, between 1925 and 1929, production was running slightly above its secular trend. Frederick C. Mills in *Economic Tendencies in the United States* (New York: National Bureau of Economic Research, 1932), pp. 2, 188, and 244, presents figures supporting, in a general way, the conclusions of Snyder and Persons. Arthur F. Burns in *Production Trends in the United States since 1870* (New York: National Bureau of Economic Research, 1934) gives figures which seem to validate the position of Warren and Pearson.

technocratic or New Deal theory that industrial production has, in the last decade, been rising at a phenomenal rate rests upon mere assertion unsupported by any adequate statistical evidence.

All in all, it is difficult to believe that, with people and things as they actually exist, and weekly working time no longer than it was in 1929, any practicable form of organization could, at present, step up production to a level much more than 20% above that attained in the year just mentioned. This figure assumes a continuation, from 1929 to 1934, of the normal rate of increase of 4% per annum.

While the technocratic theories just discussed are certainly open to serious question, they are by no means so bizarre as the contention of the New Deal advocates that the depression which we have been experiencing was caused by production outrunning the consuming power of the public. As a matter of fact, there is no evidence that, at as late a date as 1929, the demand for most finished products was showing any tendency whatever to fail to keep pace with production. Goods were moving freely from producers to consumers. Only in the case of a very few commodities like wheat and copper was there an accumulation of unsold stocks. It would be strange indeed if ability to consume, after having successfully kept pace with production for centuries, should, in the short space of three or four years, fall far behind.

In defense of their theory, however, the technocrats, or New Deal proponents, cite what they refer to as the well-established fact that in nearly every industry a vastly excessive supply of buildings, machines, and equipment has existed for years. In reality, however, this is not a truth but a mere assumption based upon false premises. The technocrats have failed to take cognizance of the following important facts:

1. That, in a society in which people are free to spend money as they choose, considerable excess capacity is necessary to care for peaks in demand and estimated future growth in demand.

2. That, even in a boom year like 1929, when employment was available to any reasonably willing worker and when the percentage of the population employed in industry was perhaps higher than at any preceding period in the nation's history,[2] a large proportion of the excess machines supposedly representing overcapacity were standing idle because workers were not available to operate them.[3]

3. What is even more important, the technocrats entirely ignore the fact that more efficient machines are always being invented and that, when these new machines are installed, all the older machines produce under a handicap. While the least efficient of the older machines are sent to the junk heap, a large proportion are retained. When prices of products are very low, few of these machines are employed. In boom times when prices are high, a large proportion of these out-of-date machines may be in use. In ordinary times, the existence of these partially obsolete machines gives rise to the belief that an industry possesses a tremendous overcapacity.

[2] For statistical evidence on this point, see the article by the present writer entitled, "The Relative Volume of Technological Unemployment", *Proceedings*, American Statistical Association, March, 1933, pp. 33–39. While the proportion of adult males at work was about the same as in other good years, the proportion of persons of working age was larger in the population of 1929 than it had been in earlier years.

[3] The evidence in the reference cited in the preceding footnote indicates that, in early 1929, able-bodied unemployed persons desiring work were very few in number.

It requires but a glance at Moody's *Manual* to see that most corporations write off annually huge sums to cover depreciation. In the case of manufacturing concerns, depreciation consists largely of equipment becoming obsolete or obsolescent. It follows that, at any given moment, a large part, and perhaps the whole, of the so-called overcapacity of plant and equipment has already been written off on the books of the companies owning it. Instead of considering this excess capacity as a menace, it should be thought of as a reserve wisely maintained for use in times when demand is unusually strong.

As further evidence of their contention that consumption cannot keep up with present-day production, the technocratic proponents of the New Deal call attention to the obvious fact that a man can eat but a limited amount of bread and can wear but one suit of clothes at a time. They follow this up with the assertion that a family usually desires but one radio, one refrigerator, one automobile, and one house. To the superficial thinker, this latter assertion doubtless appears almost as obvious as the first. Nevertheless, it comes far indeed from presenting a correct picture of the existing situation.

But even the first statement, though literally true, is misleading. While, fortunately, most of the inhabitants of the United States, do have as much bread as they care to eat, it by no means follows that their respective desires for food are satiated. When measured in terms of calories, bread is a cheap food. On the other hand, meat, milk, and fruits are dear. The reason for this price difference may be illustrated by considering the case of pork. Every farmer knows that it takes five or six pounds of grain to produce a pound of pork. However, when eaten, the pound of pork is less "filling" than the bread made from a pound of grain. The same principle holds in the case of other meats, eggs, and milk. Poverty-stricken families, therefore, eat bread instead of eggs, meat, milk, fruit, or other expensive foods. Here we find one of the causes for the "surplus output" of animal products which has recently been so discouraging to the farmers.

According to a report of the United States Children's Bureau quoted in the *New York Evening Post* of July 28, 1933, the health of ⅕ of the children of the United States has been impaired by underfeeding during the years of depression. Perhaps the Children's Bureau has painted conditions blacker than they really are. The fact remains, however, that milk consumption in our cities has shrunk notably. Is it to be supposed that the parents of the children have satiated their appetites with choice foods while the children have needed milk? The answer is obvious. Statistics indicate that at least ⅕ of the normal working force of the nation has been idle during a large part of the last three years. Probably another ⅕ has not worked full time. If these idle persons were again employed at remunerative wages, is it not clear that they would consume vastly more eggs, meat, milk, fruit, and other expensive articles of diet than they do at present, and that much more grain than now called for would be required to feed the poultry and live stock necessary to satisfy the enlarged demand for animal products?

While relief has been granted on a scale hitherto unparalleled and actual starvation has thus been largely prevented, it appears almost certain that a considerable proportion of the unemployed have not been enjoying an adequate diet. For the sake of argument, however, let us assume that their diet

has been adequate but not liberal. Even so, the additional acreage of farm land necessary to provide a liberal instead of merely an adequate diet is a matter of consequence. Preliminary estimates made by Dr. O. E. Baker of the United States Department of Agriculture indicate that the former diet calls for but 1.5 acres of farm land per capita, while the latter requires 2.1 acres per capita, an increase of 40%.[4] Grazing lands are excluded from consideration in both cases.

On the basis of the estimates just cited, it appears that, if both the unemployed and the part-time workers were given full-time employment, the nation's demand for foodstuffs would automatically expand by at least 10 or 12%. The value of this increase in supply would amount to perhaps $2,500,000,000, a figure nearly as large as the total value of our agricultural exports in banner years. Such a growth in demand would greatly lessen the worries of American farmers about surplus hogs, surplus cattle, surplus milk, surplus poultry, and surplus fruits and vegetables.

Unfortunately, the nation's demand for goods is not determined by the wants of the inhabitants but is curtailed by their inability to pay for the goods desired. Buying power, in turn, is limited by production, for unless we produce goods suitable for exchange we soon find ourselves unable to purchase the goods offered by others. If production, and hence buying power, were vastly increased, the demand for goods would expand to limits not previously approached. The $2,500,000,000 additional demand for foodstuffs would seem trivial in comparison to the values of products called for to meet wants for goods of other types.

[4] See the discussion of this problem by Hazel K. Stiebeling in the *Proceedings*, American Statistical Association, March, 1934, pp. 186-192.

Adequate medical, dental, and hospital care would cost the average family at least $270 per year. On this basis, the bill for the entire population of the nation would be not less than $8,000,000,000 annually, or double the $4,000,000,000[5] which was actually expended for this purpose in 1929.

Before cutting down the hours of labor per week, it would certainly be logical to provide each family with a month's vacation annually. A very modest allowance to cover vacation costs per family would be $15 per day or $450 for the month's outing. Families going abroad would, of course, spend far more than that. Perhaps, however, a total of $12,000,000,000 would suffice to transport and entertain the traveling public in a reasonably satisfactory manner. It is improbable that, at present, vacation costs amount to as much as $5,000,000,000. This leaves an excess of $7,000,000,000.

In normal times the people of the United States spend something like $9,000,000,000 for automobiles, gasoline, tires, and miscellaneous expenses connected with the operation of motor cars. About 4/5 of the passenger automobiles purchased are small cars costing less than $1,000. The probabilities are that, if they could afford it, 3/5 of the purchasers of these cheaper cars would buy cars costing at least $2,000. Such cars would call for more gasoline, larger tires, and more expensive repairs. It seems safe to say that to satisfy the immediate desires of the public for more comfortable motor transportation would call for at least $4,500,000,000 additional expense in this field. Besides, there are even yet many families who

[5] For the basis of these figures see Louis S. Reed's abstract of "The Ability to Pay for Medical Care," *Publication No. 25*, Committee on the Costs of Medical Care.

do not possess a car and millions now having but one car could use two or three to advantage. Given sufficient income, they would doubtless add another billion to the demand for transportation by motor, making the total amount to be added equal $5,500,000,000.

Next let us consider the case of clothing. Can our factories turn out more clothing than the inhabitants of the United States desire to use? It is, indeed, probably true that most of these inhabitants have enough habiliments to protect them at least moderately well against the inclemency of the weather. But are we to suppose that the wives and daughters of men who are unemployed, or even of men who earn from $1,000 to $2,000 a year, have as many and as expensive garments as they care to wear? A dress or a coat may cost $2 or $200. To make the latter probably calls for 50 times the labor required to produce the former. If the 40,000,000 women and girls in the United States were given *carte blanche* to buy whatever clothing they desired, does anyone doubt that the average annual per capita bill would be at least $400? Such a basis would call each year for $16,000,000,000. Another $10,000,000,000 would certainly be needed to meet the desires of the men, boys, and small children for adornment. Contrast this $26,000,000,000 clothing bill with the $9,000,000,000 which is estimated to have been spent for clothing in the boom year of 1929. The increase is $17,000,000,000.

But the clothing bill would be entirely overshadowed by the cost of the new housing which the American people would demand, provided they could afford to purchase it. Even with our present circumscribed tastes in housing, it is safe to say that there are at least 10,000,000 families who are longing for comfortable, attractive, and spacious new houses. With costs as at present, such a home certainly could not be erected for less than $10,000. A suitable air-conditioning plant would add $2,000, and various other modernizing improvements another $2,000 to its cost. It would be safe to add $1,000 for landscaping the grounds, and $3,000 for new furnishings. The total of these items is $18,000. To house properly these 10,000,000 families would require, therefore, something like $180,000,000,000. But this is not the end of the wants for better housing. The vast majority of the 15,000,000 other homes in the United States need to be air conditioned. Most of them ought to be modernized in other details. Were the money easily available, improvements of this nature costing at least $4,000 per home would presumaby be made. This would add to the bill for housing and furnishings another $60,000,000,000, making the total $240,000,000,000. If this were spread over a 10-year period, it would mean $24,000,000,000 a year in wages to labor or in orders to manufacturers, contractors, and dealers. Thereafter, it would be necessary to cover depreciation and repairs. After a few years, an allowance of 4% or 5% for these purposes would not be excessive. This would call for $10,000,000 each year, indefinitely.

Thus far we have dealt with wants usually satisfied through purchases of goods by individuals. One must remember that there are also other important wants which are commonly satisfied by public action. Take, for example, the case of roads. In the United States, there are some 500,000 miles of sand-clay or graveled improved roads. All these are unsuited to the motor age and ought to be converted into modern highways. To do this would cost at

least $20,000 per mile. The total expenditure needed for this improvement would, therefore, amount to at least $10,000,000,000.

Furthermore, there are some 2,000,000 miles of earth roads which obviously ought to be paved or at least given a macadam surface. Perhaps this could be done for $7,500 per mile. At this figure, the total cost of improving these earth roads would amount to $15,000,000,000.

In addition to the roads just mentioned, there is a crying need for a system of superhighways passing through and radiating from our leading cities. Such highways should, of course, have no grade crossings. Except in congested districts, they should be bordered with trees, shrubs, and grass. Roads of this type are, however, extremely expensive. Ten thousand miles of such highways at $1,000,000 a mile would cost $10,000,000,000.

The road costs thus far mentioned amount to $35,000,000,000. Doubtless $5,000,000,000 could safely be added to cover the separation of rural grade crossings and the building of bridges over streams. The $40,000,000,000 road program thus arrived at might be distributed over 10 years. This would obviously require a yearly outlay of $4,000,000,000 for construction alone. Another billion dollars would doubtless be needed annually to keep the system in operation. During the next decade, therefore, roads alone would call for new money amounting to $5,000,000,000 each year.

To evaluate all existing unsatisfied wants of the people of the United States would be an impossible task. All that has been attempted is to set down a few of those which are so obvious as to force themselves upon one's attention. Even so, in the aggregate, they amount to no small figure. On the assumption that the costs of permanent improvements are spread over a decade, we arrive at the summary given in Table I.

TABLE I. *Additional* COSTS FOR EACH YEAR OF THE NEXT DECADE

Item	Amount
Food	$2,500,000,000
Care of health	4,000,000,000
Vacation costs	7,000,000,000
Motor transport	5,500,000,000
Clothing	17,000,000,000
Housing	24,000,000,000
Roads and highways	5,000,000,000
TOTAL	$65,000,000,000

It will be observed that the items in the above list cover but part of the wants now present. Nothing has been allowed for such really expensive luxuries as jewels and works of art. Nevertheless, the *additional* items now desired cost more than the estimated total income of the people of the nation in 1932.

Furthermore, it would be folly to assume that, if a great increase of the national income permitted the purchase of the additional goods mentioned above, the wants of the public for goods would thereby be satisfied. The real effect would doubtless be merely to school the majority in the use of new luxuries, so that wants would be no more nearly satisfied than they were before the increase in income took place. Moreover, the wants thus far described are associated with things as they are. If the per-capita productive power of the American people continues to increase, the day will doubtless come, and that before many decades, when a radical reconstruction of our existing physical plant will be undertaken.

One improvement for which there is a crying need is the elimination of that widespread nuisance, smoke. To get rid of this blot upon our civilization, it is necessary to install in every coal-

burning furnace, not already so equipped, a satisfactory stoking device. The cost of applying this improvement in factories, locomotives, steamships, and other plants now befouling the air with smoke would probably run into billions of dollars.

Other desirable but more revolutionary reforms would be far more expensive. To tear down the ugly brick and stone boxes which make up so much of a modern city and erect in their places great palaces surrounded by beautiful parks would be a tremendous undertaking; yet such is the task which, if progress continues, may well be considered by our descendants to be imperative. The palaces will contain homes, market places, offices, and workshops. The lighting system will so well counterfeit direct sunlight that the latter will be unnecessary to preserve health. All air admitted to the palaces will be cleaned and its humidity and temperature properly regulated. Under these circumstances, there will be no reason for giving rooms outside exposures, and the problem of large-scale housing will be much simplified. These gigantic palaces will be connected with each other and with the world at large by elaborate underground transportation systems. Roads will never cross each other on the same grade and slow moving and rapid moving traffic will be carefully segregated. Easy access to freight terminals, landing piers, and airports will, of course, be afforded. To accomplish all this will probably require expenditures exceeding the entire present wealth of the United States.

But this is the program of the future. The $65,000,000,000 a year total, which was mentioned in an earlier paragraph, allows nothing for such Utopian developments. It covers only wants already well defined. In our present stage of scientific progress it would be extremely difficult, and perhaps impossible, to add this amount to the national income. Since an increase in income connotes a corresponding increase in physical productivity, it evidently could not be accomplished unless the vast majority of able-bodied men and women worked vigorously early and late. The chances are that many of the items on the program are not at all worth such strenuous endeavor.

America has the opportunity of choosing not, as Secretary Wallace says, between two, but, in reality, among at least three courses. It may set every one working at a rate similar to that characterizing the years 1928 and 1929 and, as a result, enjoy an income of around $110,000,000,000 a year. It can increase working hours and practice the strenuous life, thus enlarging the national income to perhaps $130,000,000,000. It can reduce crop acreage, rigidly restrict foreign trade, adopt the 30-hour week, abolish sweat shops, eliminate the labor of youths under 18, adults over 60, criminals, and all married women, limit the use of efficient machinery, utilize insurance to subsidize unemployment and, as a result, keep the national income down to the depression level of $50,000,000,000 to $60,000,000,000 per annum. The decision as to which course to pursue rests ultimately with the voters. These voters can and ought to vote for the arrangement which pleases them best, but, before they cast their ballots, they also ought to understand clearly the program for which they are voting.

The Trend of Electric Utility Rates: 1930-1933

By L. G. CANNON and D. F. ESTES

AN analysis of the trend of private electric utility service rates in the United States from 1930 to 1933, reflecting the effect of the depression and the first impact of deflation on the electric light and power industry, comes as a timely prelude to the recently authorized Federal Power Commission investigation of the 1934 rate situation. Started in September, 1933, by members of the Public Utilities Seminar[1] in the School of Commerce at Northwestern University, a survey of the 1930–1933 rate trend was undertaken because of the growing general interest in utility rate matters, which, in the case of the electric utilities, was then finding expression in various and sundry rate comparisons, climaxed by the announcement of the T. V. A. "yardstick" measurement.

Nature of the Survey

The survey was conceived as a study of the change in rates or prices for electric service to residential, commercial, and industrial consumers throughout the country, and although the data upon which the trend was built were found to contain the basis for a so-called rate comparison, there was no thought of making a rate comparison and, accordingly, the average rates which were developed to afford a survey of the rate of price trend are not reported here. As will presently be seen, the survey was developed by applying to assumed consumptions and demands the rates published by the National Electric Light Association for 1930 and by the Edison Electric Institute for 1933 (including the supplement of September 1, 1933). From the N. E. L. A. and E. E. I. Rate Books data on prices for electric service were developed for 399 cities in 46 states (as well as the District of Columbia), having an aggregate population of more than 71% of the total urban population[2] of the United States.

The reason for using hypothetical consumptions was to eliminate the variable factor of usage of service which appears in average rates per kilowatt-hour developed from statistics of the industry relating to revenue and kilowatt-hour sales and which confounds any attempt to find price change *per se*. The assumptions were made to approximate the experience of small, medium-sized, and large consumers in the residential, commercial, and industrial classifications, but the conditions adopted were somewhat arbitrary and in no sense were they expected to provide a flexible average (if such could be achieved) as would be necessary to make a comparison of rates between cities whose tariffs are the product of their individual consumer frequency experience. It was appreciated from the first that one of the major difficulties of the project would be to select hypothetical use factors which would meet with the approval of all persons likely to be interested in the results of the survey. The factors which were finally selected were arrived at after consultation with several individuals engaged in rate analysis work, but even so there was no unanimity of opinion reflected in the choice. However, it is the authors' belief that, while other data

[1] The Public Utilities Seminar was directed by Professor Paul J. Raver, who lent much valuable assistance to the survey and analysis of the rate trend. In addition to the authors, members of the Seminar who participated in the project were: F. W. Boldenweck, N. Galitzine, V. J. Payton, G. E. Rodman, C. T. Lundquist, and E. N. Asmann.

[2] As of the 1930 *Census*.

might have been used in providing a basis for the rate trend from 1930 to 1933, any other set of factors would not have produced any more positive evidence of the trend. This point was demonstrated at the outset when the smallest commercial customer was first designated as having a 5 kw. maximum demand and a 540 kw. hr. consumption. Later, the factors of 2 kw. and 145 kw. hrs. were substituted for this hypothetical consumer. The substitution resulted in a slightly different trend as measured by the percentage of change in average rate between the two years, but had seemingly little or no effect on the relation of this customer's rates to those of the other consumers as measured by the rate differentials.

While the use of hypothetical factors of service usage was regarded as constituting the most satisfactory device for gauging the changes in prices of electricity, the limitations of the method were appreciated. It was found to be impossible to allow for every factor required in applying some of the rate schedules. Particularly was this true in the case of some of the industrial rates, where it was found impracticable to adjust for such matters as fuel clauses, varying measurements of maximum demand, and the various methods of determining the basis for billing maximum demand. Inasmuch as the *trend of rates* was all that was being sought, it was not regarded as a serious matter that such differences occurred between schedules of rates of companies in different cities. Only when the differences cropped up between the 1930 and 1933 schedules of the same company in the same city did the disparity in results become a definite error which tended to give a distorted picture when subsequent computations were made. For example, liberalized maximum demand measurement or billing sometimes accompanied increased tariff charges from 1930 to 1933, which, because the rates were figured according to the monthly factors set up, would show an increased bill and increased average rate per kilowatt-hour over the 1930 results. As a matter of fact, the liberalized terms of the schedules might well have resulted instead in a decreased bill and average cost per kilowatt-hour to an actual customer of each company in question. As a result of the limitations of the hypothetical factors, doubtful increases in industrial rates were found in six states. A few doubtful increases were also noted in the commercial classification.

However, the distortion that may have been caused by these doubtful changes was minimized by the process of weighting according to population, which was used to develop the rates of the individual cities into averages for the states, geographical divisions, and the country as a whole. Allowing for the effect of the population weighting of the industrial rates, it is believed that the error in these rates did not affect the accuracy of the result for the United States by more than .2%. The prevailing rule in figuring the rates was to select the lowest rate offered for each customer classification which was consistent with the character of the hypothetical factors. All rates were figured net, using discount allowances. Only alternating current rates were used, unless a company happened to offer rates only for direct current. Off-peak or special class rates were eliminated from consideration. Adjustments of maximum demand for power factor requirements above 80% were made in figuring rates for the industrial classification. Allowance for the differential between primary and secondary metering rates for industrial consumers was made in the case of the primary

rates by adding 1½% to the maximum demand and 3% to the energy factors, and by adding overhead charges for the customers' transformer equipment and maintenance. The data upon which the survey was based are detailed below.[3]

Results of the Survey

Weighted according to population (1930 *Census*), the rates of the 399 cities included in the survey were computed to provide averages for 1930 and 1933 in each consumer classification for 47 states, including the District of Columbia, for the eight geographical divisions of the country, and for the United States as a whole.[4]

From the analysis of percentage of change in the weighted average rates from 1930 to 1933 shown in Table I, it appears that the emphasis on rate reductions in the three-year period occurred in the residential classification. The test of this apparent result is found in the study of rate differentials contained in Table II. In relation to the average prices for industrial service, all three hypothetical groups of residential consumers bettered their positions in the ratios of residential to industrial rates from 1930 to 1933. In the case of the average commercial rates the table of differentials indicates that the 145 kw. hr. consumer in the commercial classification enjoyed a greater reduction than the 25 kw. hr. residential user; the medium sized consumers of both residential and commercial groups maintained the same pace of reduction, while the change in differentials between the largest consumers of each of these classifications appears to have favored the 100 kw. hr. residential customer.

In the ratios of average commercial rates to average industrial rates, the commercial group seems to have received a greater reduction than the industrial classification. This is demonstrated in the following analysis of comparative rate differentials:

	Times Commercial to Industrial Rates	
	1930	1933
145 Kw. Hrs. to 7, 200 Kw. Hrs.	1.99	1.93
1,440 Kw. Hrs. to 48,600 Kw. Hrs.	2.62	2.53
4,500 Kw. Hrs. to 432,000 Kw. Hrs.	3.01	2.99

In the residential and industrial classifications, the percentage of reduction in average rates is progressively greater from the small to the large consumer of each group, while the process of reductions appears to be mixed in the case of the commercial classification of

[3] Data for Electric Utility Rate Survey

Residential Classification

Group Kw.Hrs./Mo.	Connected Load (Watts)	Type of Load	No. of Rooms* & Sq. Ft. of Floor Area	No. of Meters
25	450.5	Ltg., & Sm. Appl.	2 (400 sq. ft.)	1
50	1,020.0	Ltg., Sm. Appl. & Refrig.	5 (1,000 sq. ft.)	1 or 2
100	1,892.0	Ltg., Sm. Appl., Refrig., & Fan	10 (2,000 sq. ft.)	1 or 2

Commercial Classification (Small Light and Incidental Power)

Group Kw. Hrs./Mo.	Kw. Demand	Load Factor	Power Factor	No. of Meters
145	2	10%	100%	1 or 2
1,440	10	20%	100%	1 or 2
4,500	25	25%	100%	1 or 2

Industrial Classification (Large Power and Incidental Light)

Group Kw.Hrs./Mo.	Kw. Demand	Load Factor	Power Factor	No. of Meters	Overhead Charges for Primary Rates
7,200	50	20%	80%	2	$ 7.50/Mo.
48,600	225	30%	80%	2	43.75/Mo.
432,000	1,500	40%	80%	2	351.55/Mo.

*This is for a real estate room count. For an active room count the following assumptions were made: *25 Kw. Hrs./Mo.*—1 living room-bedroom and 1 dining room-kitchen; *50 Kw. Hrs./Mo.*—1 dining room, 1 kitchen, 2 bedrooms; *100 Kw. Hrs./Mo.*—1 living room, 1 dining room, 1 kitchen, 1 den or sun room, 1 breakfast room, 5 bedrooms.

† 25 kw. hrs. for refrigerator.

‡ 50 kw. hrs. for refrigerator.

[4] Wyoming and Nevada were excluded from the survey because rate schedules for cities in these two states were not published for 1930.

TABLE I. AVERAGE PERCENTAGE CHANGE IN WEIGHTED AVERAGE ELECTRIC RATES, BY STATES AND GEOGRAPHIC DIVISIONS, 1930-1933.

Geographic Division and State	Number of Cities Surveyed	Total Population of Cities Surveyed	Percentage of Total Urban Population Surveyed	Residential Classication			Commercial Classification			Industrial Classification		
				25 Kw. Hrs.	50 Kw. Hrs.	100 Kw. Hrs.	145 Kw. Hrs.	1,440 Kw. Hrs.	4,500 Kw. Hrs.	7,200 Kw. Hrs.	48,600 Kw. Hrs.	432,000 Kw. Hrs.
New England												
Maine	3	134,507	41.8	0.00	0.00	0.	0.0000	0.00	0.00	+4.04	0.00	0.00
Vermont	1	24,789	20.8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
New Hampshire	3	133,525	48.9	−4.98	−5.97	−4.85	−10.14	−2.77	−4.17	0.00	0.00	0.00
Massachusetts	35	2,853,665	74.5	−7.59	−5.54	−5.33	−6.63	−7.61	−6.66	−0.55	−6.38	+0.68
Connecticut	16	976,810	86.2	−3.80	−8.15	−9.52	−4.45	−5.90	−6.16	0.00	−0.46	−1.40
Rhode Island	7	505,922	81.0	−13.20	−6.29	−5.24	−7.99	−6.84	−6.56	−1.10	−1.10	−1.53
	65	4,629,218	73.5									
Percentage Change—New England				−7.35	−6.00	−6.06	−6.22	−6.90	−6.29	−0.58	−3.96	0.00
Middle Atlantic												
New York	29	9,318,895	88.3	0.00	−6.96	−13.08	−0.71	−8.64	−1.38	−0.73	−2.43	−7.10
Pennsylvania	34	4,217,431	64.5	−5.22	−6.00	−9.75	−9.01	−6.46	−1.07	−5.50	−3.17	−0.76
New Jersey	32	2,329,511	69.8	−2.72	−9.41	−7.65	−2.64	−7.18	−5.21	−0.48	−11.40	−1.22
	95	15,865,837	72.8									
Percentage Change—Middle Atlantic				−1.88	−7.14	−11.38	−3.21	−6.64	−1.92	−1.78	−3.87	−4.67
East North Central												
Wisconsin	15	1,093,453	70.4	−3.74	−1.48	−3.29	−5.05	−5.25	−5.07	−4.67	0.00	0.00
Michigan	14	2,449,203	74.2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	−0.46	−4.46
Illinois	26	4,526,297	80.5	−3.81	−1.89	−0.77	−2.97	−4.86	−6.20	−2.26	−0.98	−10.04
Indiana	15	1,183,759	66.0	−6.14	−7.59	−12.38	−8.55	−6.98	−9.55	−2.37	−8.50	−7.00
Ohio	30	3,493,064	77.5	−8.42	−9.95	−12.30	−8.00	−5.54	−6.84	−4.00	−3.03	−2.82
	100	12,745,776	76.0									
Percentage Change—East North Central				−4.56	−4.52	−5.40	−4.53	−4.35	−5.25	−2.44	−2.42	−5.71
East South Central												
Kentucky	6	511,092	63.9	−6.20	−9.46	−10.45	−4.54	−1.41	−1.92	−2.12	−0.45	−3.47
West Virginia	6	279,287	57.0	−3.76	−4.02	−13.00	0.00	00.0	0.00	0.00	0.00	0.00
Virginia	7	531,191	67.6	−12.43	−10.52	−13.30	−11.33	−8.07	−6.62	0.00	0.00	0.00
Maryland	3	873,482	89.5	−23.80	−1.56	−1.39	−1.36	−3.93	−3.60	−0.34	0.00	0.00
Delaware	1	106,597	86.6	−6.54	−8.93	−30.20	−4.40	−18.70	0.00	−0.68	−0.96	−6.20
Tennessee	5	654,781	73.0	−9.02	−5.30	−12.67	−8.48	−10.30	−8.58	0.00	0.00	0.00
North Carolina	7	383,397	47.4	−3.45	−16.02	−24.40	−12.37	−10.50	−20.20	+1.58	+1.65	+1.30
South Carolina	4	171,723	46.3	−5.63	−11.74	−27.70	−12.22	−11.00	−17.40	−0.45	−2.72	−5.88
Georgia	5	512,692	57.3	−1.50	0.00	−10.58	−1.44	−1.61	−1.69	+3.71	+2.89	+8.48
Alabama	5	437,025	58.7	−14.80	−18.30	−19.30	−6.89	−2.79	−4.72	0.00	0.00	−1.71
Mississippi	3	103,179	30.4	0.00	−4.63	−12.42	0.00	0.00	0.00	−16.60	−6.98	+0.55
Florida	4	283,802	37.4	−0.19	−4.16	−9.90	−2.21	−4.28	−7.03	−0.78	−0.76	−0.86
District of Columbia	1	486,869	100.0	−18.05	−17.03	−20.20	−18.68	−24.90	−19.55	−7.27	−9.28	−12.10
	57	5,335,117	62.9									
Percentage Change—East South Central				−9.00	−8.09	−13.90	−6.49	−7.16	−7.38	−1.03	−1.07	−0.72
West North Central												
North Dakota	1	28,619	25.2	−5.24	−4.30	−4.45	−5.94	−1.13	−4.25	0.00	0.00	0.00
South Dakota	1	33,362	25.5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	−3.47
Minnesota	3	837,425	66.6	−0.80	−1.30	−1.32	−2.42	−2.03	−2.27	−15.75	−4.35	−13.84
Nebraska	2	289,939	59.7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Iowa	12	594,263	60.6	−11.00	−10.15	−12.40	−10.62	−5.29	−5.55	−3.90	−1.36	−2.83
Kansas	4	324,172	45.8	−1.45	−1.84	−1.85	−4.66	−6.59	−5.24	−5.09	−7.88	−10.00
Missouri	6	1,414,428	76.0	−1.58	−2.68	−3.41	−0.31	−1.42	−2.05	0.00	−3.74	−4.96
	29	3,522,208	63.4									
Percentage Change—West North Central				−3.44	−3.73	−4.29	−3.17	−2.69	−2.81	−5.35	−4.41	−5.09
West South Central												
Oklahoma	5	390,533	47.6	−20.70	−7.19	−9.44	−19.23	−7.69	−10.88	0.00	0.00	−2.20
Arkansas	3	133,868	35.0	−19.90	−21.45	−13.00	−5.75	−9.95	−11.58	0.00	0.00	0.00
Texas	12	1,364,140	57.2	−6.82	−8.14	−7.98	−23.75	−11.10	−3.77	−4.08	−6.50	−3.33
Louisiana	3	566,146	67.9	−0.53	−0.24	−0.14	−0.68	−1.81	−0.99	+12.00	+4.57	0.00
	23	2,454,687	55.4									
Percentage Change—West South Central				−8.04	−6.81	−6.21	−17.10	−8.51	−4.49	+0.26	−2.84	−2.04
Mountain												
Montana	2	68,354	37.7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Idaho	1	21,544	16.6	−6.25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Wyoming												
Nevada												
Utah	2	180,539	67.8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Colorado	2	337,957	65.0	−7.18	−9.10	−5.37	−7.55	−1.15	0.00	0.00	−4.54	−11.80
Arizona	2	80,624	53.8	−10.35	−16.30	−24.10	−22.95	−21.40	−23.90	−20.30	−15.00	−19.30
New Mexico	1	26,570	24.8	−13.70	−24.00	−24.00	−16.53	−16.30	−18.53	0.00	0.00	0.00
	10	715,588	49.1									
Percentage Change—Mountain				−6.63	−8.04	−8.41	−7.35	−4.21	−5.16	−3.66	−4.43	−12.43
Pacific												
Washington	5	564,588	63.8	−1.75	−3.80	−0.27	−5.14	−0.97	−8.80	0.00	0.00	0.00
Oregon	1	301,815	61.5	−11.53	−4.10	−1.98	−16.72	−9.35	+4.86	0.00	0.00	0.00
California	14	2,897,720	90.6	−5.18	−9.05	−12.77	−5.48	−4.65	−14.93	−2.68	0.00	0.00
	20	3,764,123	68.0									
Percentage Change—Pacific				−5.16	−7.74	−10.38	−6.60	−4.69	−12.60	−2.45	0.00	0.00
United States												
	399	49,032,554	71.1									
Percentage Change—United States				−4.64	−6.43	−8.78	−5.29	−6.34	−4.62	−2.05	−3.15	−4.16

customers. Apparently, the 100 kw. hr. consumer in the residential group received the largest percentage reduction in average rate of any of the consumer types in all three classifications.

A grading of the geographical divisions on the basis of the changes in their respective weighted average rates discloses that the East South Central area had the greatest percentage reduction in residential rates, the West South Central and the East South Central divisions led the other divisions in percentage decrease in the commercial classi-

TABLE II. ELECTRIC RATE DIFFERENTIAL COMPARISON, BY STATES AND GEOGRAPHIC DIVISIONS, USING WEIGHTED AVERAGE RATES FOR 1930 AND 1933.

Geographic Division and State	25 Kw. Hrs.				50 Kw. Hrs.				100 Kw. Hrs.			
	To 145 Kw. Hrs.		To 7,200 Kw. Hrs.		To 1,440 Kw. Hrs.		To 48,600 Kw. Hrs.		To 4,500 Kw. Hrs.		To 432,000 Kw. Hrs.	
	1930	1933	1930	1933	1930	1933	1930	1933	1930	1933	1930	1933
New England												
Maine	0.99	0.99	2.54	2.45	1.38	1.38	3.45	3.45	1.52	1.52	4.08	4.08
Vermont	1.18	1.18	3.70	3.70	1.61	1.61	4.07	4.07	1.86	1.86	3.73	3.73
New Hampshire	0.95	1.01	3.15	3.00	1.33	1.29	4.67	4.39	1.77	1.76	4.97	4.74
Massachusetts	0.98	0.97	2.08	1.93	0.93	0.95	3.10	3.13	1.03	1.04	4.00	3.77
Connecticut	0.86	0.86	1.99	1.91	1.08	1.06	2.88	2.66	1.34	1.29	4.26	3.91
Rhode Island	1.14	1.08	3.36	2.95	1.08	1.09	4.19	3.97	1.18	1.20	4.96	4.78
Rate Differential—New England	0.97	0.96	2.21	2.06	1.00	1.01	3.22	3.15	1.13	1.13	4.18	3.92
Middle Atlantic												
New York	1.02	1.03	1.75	1.76	1.07	1.09	3.06	2.93	1.24	1.09	4.04	3.78
Pennsylvania	0.99	1.04	2.10	2.11	1.30	1.31	3.53	3.43	1.45	1.32	4.12	3.75
New Jersey	1.17	1.17	2.12	2.08	1.37	1.34	3.41	3.49	1.20	1.17	3.50	3.28
Rate Differential—Middle Atlantic	1.04	1.05	1.90	1.89	1.17	1.17	3.24	3.13	1.27	1.15	3.98	3.70
East North Central												
Wisconsin	0.78	0.79	1.91	1.93	0.98	1.02	2.68	2.64	1.15	1.17	3.93	3.80
Michigan	0.98	0.98	1.76	1.76	1.11	1.11	2.36	2.37	1.08	1.08	2.84	2.96
Illinois	0.87	0.86	1.48	1.46	1.17	1.20	2.59	2.56	1.23	1.30	4.14	4.58
Indiana	1.09	1.11	2.32	2.25	1.36	1.36	3.05	3.08	1.59	1.54	3.81	3.59
Ohio	1.09	1.09	2.14	2.04	1.34	1.28	2.94	2.73	1.53	1.44	3.78	3.41
Rate Differential—East North Central	0.96	0.96	1.80	1.77	1.20	1.20	2.68	2.62	1.30	1.30	3.70	3.72
East South Central												
Kentucky	1.03	1.02	2.06	1.97	1.56	1.43	3.48	3.17	1.79	1.63	5.18	4.80
West Virginia	1.24	1.29	2.89	3.00	1.70	1.63	3.46	3.32	1.57	1.37	4.14	3.60
Virginia	1.09	1.07	3.28	2.87	1.61	1.57	4.47	4.00	1.67	1.55	4.98	4.32
Maryland	1.52	1.17	2.26	1.73	1.44	1.48	2.83	2.79	1.41	1.44	3.04	3.00
Delaware	1.11	1.08	2.92	2.75	1.33	1.49	3.97	3.65	2.11	1.47	5.74	4.26
Tennessee	1.05	1.05	2.80	2.55	1.17	1.25	4.04	3.83	1.37	1.31	4.56	3.98
North Carolina	1.11	1.22	3.34	3.17	1.40	1.31	4.18	3.45	1.68	1.59	4.54	3.38
South Carolina	1.13	1.21	3.79	3.58	1.58	1.57	4.54	4.11	1.85	1.62	5.55	4.26
Georgia	1.20	1.20	3.36	3.19	1.39	1.41	4.48	4.35	1.53	1.39	5.37	4.44
Alabama	1.03	0.95	3.48	2.96	1.44	1.21	4.95	4.05	1.78	1.51	5.80	4.76
Mississippi	1.00	1.00	2.50	3.00	1.13	1.08	3.28	3.36	1.31	1.14	4.26	3.72
Florida	1.10	1.12	2.70	2.72	1.18	1.18	3.55	3.43	1.30	1.26	3.72	3.39
District of Columbia	1.03	1.04	1.65	1.46	1.10	1.22	2.42	2.22	1.31	1.30	3.79	3.44
Rate Differential—East South Central	1.14	1.11	2.70	2.48	1.38	1.36	3.70	3.44	1.54	1.43	4.47	3.88
West North Central												
North Dakota	0.88	0.88	2.14	2.02	1.22	1.18	2.62	2.52	1.32	1.32	3.56	3.40
South Dakota	0.85	0.85	1.54	1.54	1.27	1.27	2.69	2.69	1.48	1.48	3.57	3.70
Minnesota	0.67	0.68	1.33	1.56	1.21	1.22	2.60	2.68	1.33	1.34	3.32	3.80
Nebraska	1.19	1.19	2.10	2.10	1.20	1.20	2.65	2.65	1.33	1.33	3.30	3.30
Iowa	1.11	1.11	2.48	2.29	1.41	1.34	3.25	2.96	1.47	1.37	3.60	3.25
Kansas	0.86	0.89	1.47	1.53	1.03	1.08	2.26	2.41	1.13	1.17	3.00	3.27
Missouri	0.89	0.87	1.72	1.69	1.06	1.04	2.80	2.82	1.13	1.12	3.53	3.59
Rate Differential—West North Central	0.88	0.88	1.73	1.77	1.17	1.15	2.76	2.78	1.26	1.24	3.42	3.44
West South Central												
Oklahoma	0.93	0.91	2.46	1.95	1.34	1.35	3.46	3.22	1.63	1.66	5.07	4.70
Arkansas	1.06	0.91	2.74	2.19	1.21	1.05	3.67	2.88	1.32	1.30	3.77	3.28
Texas	0.85	1.04	1.69	1.64	1.04	1.07	2.90	2.85	1.33	1.27	4.01	3.81
Louisiana	1.28	1.29	2.58	2.30	1.53	1.56	4.30	4.10	1.47	1.49	5.66	5.65
Rate Differential—West South Central	0.97	1.07	2.01	1.84	1.20	1.22	3.34	3.21	1.41	1.38	4.49	4.30
Mountain												
Montana	1.08	1.08	3.83	3.83	1.24	1.24	4.88	4.88	1.42	1.42	4.74	4.74
Idaho	1.23	1.16	2.66	2.50	1.67	1.67	2.50	2.50	1.67	1.67	3.33	3.33
Wyoming												
Nevada												
Utah	1.06	1.06	2.03	2.03	0.94	0.94	2.38	2.38	1.31	1.31	2.75	2.75
Colorado	1.01	1.02	2.63	2.44	1.27	1.16	2.98	2.84	1.66	1.57	3.25	3.48
Arizona	0.99	1.15	1.61	1.81	1.15	1.23	2.59	2.55	1.13	1.13	2.58	2.42
New Mexico	1.00	1.03	2.74	2.37	1.57	1.42	3.06	2.32	1.83	1.71	3.38	2.57
Rate Differential—Mountain	1.05	1.06	2.34	2.28	1.18	1.14	2.86	2.75	1.49	1.44	3.14	3.28
Pacific												
Washington	1.22	1.27	2.16	2.12	1.61	1.56	3.25	3.12	1.34	1.47	3.11	3.10
Oregon	0.99	1.06	2.39	2.12	1.26	1.33	3.64	3.49	1.58	1.48	4.57	4.48
California	1.18	1.18	3.10	3.02	1.42	1.35	3.91	3.56	1.63	1.67	4.56	3.98
Rate Differential—Pacific	1.16	1.18	2.85	2.77	1.43	1.38	3.78	3.49	1.58	1.62	4.31	3.85
Rate Differential—United States	1.01	1.02	2.02	1.97	1.19	1.19	3.13	3.02	1.31	1.26	3.95	3.76

fication, and the Mountain and West North Central regions had the largest decline in industrial rates. From the standpoint of the greatest over-all reduction in all rate classifications, the Mountain division led the field, with the East South Central next in line, and the other regions appearing in the following order: West South Central, Pacific, New England, Middle Atlantic, East North Central, and West North Central. This gradation does not take into account the population relationships of the regions to the total population of the country, and, consequently, the method of grading on the simple basis of percentage of change in the rates does not convey any particular significance when applied to the states.

Conclusion

In the foregoing analysis it has been shown that all three consumer classifications experienced rate decreases from 1930 to 1933, which, while they did not appear to bulk tremendously large in the hypothetical analysis, undoubtedly were responsible in great measure for the 11% decline in the sales revenues of the electric utility industry in the depression period. If, as the results of the survey indicate, the largest reduction took place in rates for residential consumers, it is no overstatement to conclude that some interesting problems in the electrical utility field have been opened up as a consequence. The greatest problem in this respect was recently put up to the leaders of the industry by Mr. F. A. Newton, Chairman of the Rate Research Committee of the Edison Electric Institute,[5] when he asked the question: "Is the best field for increased sales among those (residential consumers) already using over 50 kilowatt-hours per month, or is the greatest opportunity in those below that consumption?" Mr. Newton's question was not meant to be rhetorical. The proper correlation of many factors in the promotion of the sales of electricity will be required to offset, or, at least, to minimize, the immediate depressing effect on the industry's gross revenues as the result of the business slump, the activities of many state commissions, and the impending expansion of public ownership.

A number of interesting and radical rate changes occurred after the end of the period covered in this survey. Beginning with the close of 1933 and continuing down to date, state commissions have critically examined rates and have ordered many reductions which it was not possible to include in this analysis. It will be interesting to measure the additional effect of the 1933–1934 rate changes.

Some evidence of the ultimate effect of the utilities' striving to protect their capital structures against enforced loss of revenue through rate reductions is already at hand. Lower domestic rates ordered by commissions have, in some cases, been followed by even lower rates submitted by the utilities as the companies have started an aggressive campaign to recover gross revenues by launching into competitive service fields such as cooking, hot water heating, etc. Does this new, aggressive attitude on the part of the companies—somewhat a product, to be sure, of aggressive commission regulation—presage a rapidly approaching era when electric utility prices will be governed in the main, not by the cost of service principle enunciated by state regulatory bodies, but by the value of the service measured by competition with gas utilities, service-commodity industries, isolated power plants, and public power projects.

[5] In an address before the Sales Conference of the Edison Electric Institute at Chicago, March 14, 1934.

II. The Rationalization of Electricity Supply in Great Britain*

By MELVIN G. DE CHAZEAU

IN THE first part of this paper the reader has been introduced to the nature and functions of the Central Electricity Board under the Electricity (Supply) Act of 1926 and the problems which confronted the Board during the construction phase of the grid. In the following pages certain difficulties which the Board must meet as it begins commercial operations under the present set-up will be examined and their significance for the ultimate success of the plan indicated.

III. Commercial Trading Under the British Plan[43]

The British plan has been presented as a new, experimental compromise between public and private ownership and control. The technical value of the national grid is not appraised in this paper. The question remains, however, whether, with the existing dichotomy between public and private interests, the potential economies of base-loading can be achieved in practice and at the same time equitably allocated. No system designed to operate so as to meet costs within a 10-year period can be definitely evaluated at the very beginning of that period. But a consideration of the problems before it may help to indicate its potentialities. For this reason I exclude certain broad issues which require independent treatment—rural electrification and railway electrification in particular—and confine my attention to points which are vital to the existing type of control if the system is to succeed.

A. The Problem of Area Grid Tariffs.

With a primary transmission system and equipment designed to carry 50,000 kws. per circuit, generating capacity in selected stations in excess of demand, and industry mired in a depression for over a decade, it was obvious that conditions did not permit prices for energy which would cover all direct and overhead costs in the first years. The Electricity Commissioners therefore have approved a 10-year tariff period during which early deficits will be recouped by later surpluses so that for the period as a whole total revenues will fully cover total expenditures, including interest and sinking fund charges (the latter equivalent to depreciation) on the Board's capital investment. In addition, the Board is empowered to capi-

* The first part of this article, which appeared in this *Journal*, August, 1934, p. 254, is essential to an understanding of the issues raised in the following sections. Footnotes are numbered consecutively with those in Part I of this article.

[43] The period of commercial operation in any area is initiated by a formal notification to the owners of selected stations (generating stations chosen at the inception of an area scheme for the production of electricity under the supervision of the C. E. B.) and the publishing of a grid tariff. Under the former, the Board assumes, through the station engineers, complete control of the operation of selected generating stations, e. g., loads to be borne, periods of utilization, extensions of capacity, and the like. It exercises no jurisdiction, however, over internal management, such as hiring and ordering of employees. From this date, all energy produced in selected stations is for the account of the Board and all expenses attributable to generation or to generating plant, whether used or not, are borne by the C. E. B. The "grid tariff" is a schedule of rates at which the Board must sell electricity in bulk to any authorized undertaker in the area. The 1926 Act limits it to this class of customer, except for power to be sold outside the area of supply of an authorized undertaker with consent of the Electricity Commissioners. (Electricity (Supply) Act, 1926 (16 & 17 Geo. 5, Ch. 51), §§7, 10, 20.)

talize interest for a maximum period of seven years from the end of the year in which each loan is raised and to suspend sinking fund charges for a limited period. The determination of a grid tariff, therefore, rested upon estimates of the Board's expenses for management and transmission, the cost of production at selected stations (its purchase price for energy), and, more especially, the growth of load over the tariff period. The last was extremely difficult, for available data were far from adequate.[44] For each class of load calculations upon various bases from fragmentary data had to be made, aggregated, and checked against each other. The Board's grid tariff was more difficult to construct than the rate schedule of a power company over a similar period because its entire output must be sold to a single class of consumers, wholesale buyers for resale, each of whom must be assured a price sufficiently stable to permit quotations on long-term contracts with industrialists. Denied the minimum flexibility of a class of business through which, by variable rates, it might insure itself against errors in the estimates, it had to quote a price low enough to enable distributors to meet the competition of power sources other than public supply; and its tariff, once made, could hardly be modified *upward.*

Given this situation, the Board, buying energy (generated by selected stations) at cost of production, would have trouble in devising a rate-schedule adjusted to demand, load-factor, and power-factor for all authorized undertakers in an area. But under the 1926 Act there are two further complicating factors. The first concerns the price which the Board pays for energy. This is largely an overhead expense. The C. E. B. does not buy kilowatts and kilowatt hours as needed for resale. It must pay all costs attributable to generation or to generating plant at selected stations whether used or unused.[45] All energy generated at selected stations is for the account of the Board. In this way, although the price paid for energy generated at any given station must reflect operating expenses varying with the load placed on that station, the cost of energy to the Board throughout an area is largely an overhead expense.

The second complicating factor is that only a small proportion of the energy sold, at least during the first tariff period, is likely to be sold at the grid tariff. A selected station owner has two alternative methods of setting his energy price to the Board, provided either proves lower than grid tariff. One is

[44] Census figures were, as usual, so undifferentiated as to be of little use and the records of the Electricity Commissioners as well as those of many undertakers were not properly broken down into classes of load served. Fortunately, growth of load as a basis for tariff calculations is a problem in limits. The estimate should be sufficiently conservative that prices chosen will cover costs over the tariff period, sufficiently optimistic that prices will not be so high that they retard development. Experience during the latter half of 1933 and the first part of 1934 indicates that the estimates for Mid-East England, South East and East England, and North West England and North Wales were undoubtedly conservative.

[45] Under the Act this includes all fixed and running expenses and all overheads attributable to generation. Management charges, general expenses, rents, and taxes are allocated between generation and distribution by formula or negotiation. Interest payable to companies on money properly expended for capital purposes on generating plant and on working capital proper for generation account is limited to a minimum of 5% and a maximum of 6½%. Local authorities receive the average rate on generation investment paid by them on the debt of the electricity undertaking as a whole during the current financial year or the actual rate where loans are specifically allocated. The period of depreciation, of amortization, and of interest payments is that fixed by the Commissioners. Even if a selected station were entirely unused, the overhead expenses attributable to plant ("fixed" expenses in the foregoing) must be paid by the Board and therefore become part of the "price" of energy to the Board in that area (Electricity (Supply) Act, 1926, § 7 and 2nd Schedule).

his estimated cost (had there been no grid plan in operation) of producing his actual requirements for distribution purposes in his own station. This is the maximum that he can be required to pay for energy in any given year. This price he may obtain only by appeal to the Electricity Commissioners whose decision is final.[46] The second—and far more important—is a price determined by "adjusted station costs" as defined in the Act. A selected station owner may buy such energy as is being generated in his own station *at the time of his demand* at this price.[47]

Fundamental to the fixing of adjusted station costs is the "statutory average demand" which may be defined as the average annual demand upon the station from all sources, each monthly maximum being weighted by the number of succeeding months in which it is not exceeded.[48] One-twelth of the total fixed charges[49] divided by the statutory average demand on the station equals the price per kilowatt per month (the demand charge) actually charged the undertaker for *his* demand on the station which is assessed by application of the same method. This is a variant of the peak responsibility principle familiar in American electric rates. If there is but one customer, it would allocate actual fixed costs against that customer within a very small margin of error. But there are two customers—the Board as well as the undertaker—taking energy from the station. The result is that neither party contributes toward the expense in proportion to his use of the station, nor even to his annual peak, but rather according to his demand on the station during the first few months of the year. On the one hand, the Board may take kilowatts without expense to itself so long as the aggregate demand on the station does not exceed previous maxima established by the undertaker. On the other, it may be involved in serious loss in case of a breakdown in a base-load station during the early months of the year.[50]

[46] Whenever the sum of the annual price paid to the Board for energy, plus any unrecompensed expenditures by the undertaker on generation account, and any special expenses attributable to taking a supply from the grid is greater than the approved estimated cost to the undertaker of producing his own requirements independently, he will receive a rebate equal to the difference. (Electricity (Supply) Act, 1926, § 13.)

In practice *all* undertakers are billed monthly at the published tariff with monthly rebates so apportioned that the net adjustment of payments to or from the Board at the end of the year will be a minimum.

[47] Electricity (Supply) Act, 1926, §§ 7 and 51, and the 7th Schedule. This price is neither billed nor quoted. "Adjusted station costs" is but a method of measuring the amount of rebate from the grid tariff to a selected station owner where one is due.

[48] Maximum demand, wherever used in this paper, is twice the largest number of kw. hrs. registered during any ½ hour in the period. Output from the station (after allowing for station auxiliary services), not from the generators, is used in determining cost of production.

The method of finding statutory average demand may be illustrated simply. If maximum demand in January is 100 kws. and this is not exceeded until November when it becomes 150 kws., followed by 200 kws. in December, statutory average demand for the year is 112.5 kws. [(100 x 10) + 150 + 200) ÷ 12]. Had the January demand been 90 kws., first exceeded in October with 100 kws., other demands as above, the statutory average would have been 105 kws. [(90 x 9) + 100 + 150 + 200) ÷ 12]. Were these maxima the demands made by an undertaker on his selected station, the statutory average would be the number of kws. for which he would pay the Board. But were they the demands from all sources on the selected station, the statutory average would constitute the divisor for the determination of the charge per kw. at adjusted station costs as indicated in the text.

[49] The costs of fuel, oil, water and stores, salaries and wages, repairs, maintenance and renewals are allocated to fixed and running components by formulae ordered by the Commissioners after extended analyses of generating costs in Great Britain and the United States under varying load factors and thermal efficiencies. (Electricity Commissioners: *Statutory Rules and Orders*, 1929, No. 1015.)

[50] If there is adequate unutilized capacity in stations so inefficient that their owners take energy on the grid tariff, this will be negligible. But if the breakdown demand must be met by a more efficient station, this may so increase the statutory average demand (and hence

(Footnote 50 continued on page 368)

The statutory average demand conceals an adjustment for load factor since the price per kilowatt of monthly demand must fall as the statutory average approaches the annual maximum; and the monthly maximum demand of the undertaker (upon which this price applies) is determined upon the same statutory principle. Hence kilowatts taken by a selected station owner in any month, up to the maximum previously established, are "costless".

The kilowatt charge, finally, is modified by the power factor of the undertaker's supply at the time of his maximum demand upon the station. It is multiplied by a coefficient calculated from a formula[51] which is derived from two principles: that most generating plant is designed for operation at a power factor of 0.80 which is taken as standard, and that no more than 20% of fixed costs are affected by variations in power factor. Without going into details of calculation, the application of this coefficient is in keeping with the best modern practice. It affords an inducement to an undertaker to raise his power factor above standard, a bonus which falls progressively as power factor approaches unity and is lower than the penalty imposed when power factor falls below 0.80. Assuming the coefficient rounded to the nearest percentage, within a range of plus or minus .04 from standard power factor (taken as a decimal), inducement and penalty are equal, but beyond that range inducement falls and penalty rises at an increasing rate.[52] This is in conformity with the fact that the lower the power factor, the greater will be the saving to the utility in its improvement relative to the cost of correction involved. Beyond a certain point, to improve power factor further costs more than it saves. The kilowatt charge, thus determined, plus the running charge (the total annual running expense divided by the kilowatt-hours supplied from the station) plus a flat kilowatt-hour charge to cover the Board's expenses, constitute the price of energy at adjusted station costs.

A selected station owner may thus pay either of three prices (the published price in the grid tariff, adjusted station cost, or Section 13 costs), whichever is lowest. Since the owners of base-load stations, in which most of the energy is generated, buy electricity from the Board at adjusted station costs [53] and an indeterminate number of owners of reasonably efficient selected stations may be able to purchase at a Section 13 price, the grid tariff proper applies to only a minor portion of the energy sold. An estimate of what those sales will be

(*Footnote 50 continued from page 367*)

lower the kw. charge to the owner) that there will be a failure to meet fixed costs at that station. This cannot be passed on to the owner of the station in which the mishap occurred for (a) he is protected against excess costs by § 13 of the Act, and (b) it would be impractical to keep a base-load station out of commission long enough so to reduce the statutory average demand that the undertaker would recoup the Board in *higher* kw. payments. Hence the loss to the Board is net; in effect, it is required to pay twice for its kws.

[51] E.g.:

$$\frac{0.80 + \left(\frac{0.2}{B}\right)}{0.80 + \left(\frac{0.2}{A}\right)}$$

A and B are true power factor, expressed as a decimal, A being that of the station at the time of maximum demand and B that of the supply from the station to its owner at the time (not necessarily coincident) of his maximum demand on the station. (Electricity Commissioners: *Statutory Rules and Orders*, 1929, No. 1016.)

[52] Obviously, the basis of variation is the power factor of the station ("A" in the formula). Were A standard and B unity, the undertaker would receive a discount of 5% on the price of his kws. Reverse the assumption and he would pay a penalty of like amount.

[53] This price will be lower than the grid tariff, for it reflects the average cost of generation at a more efficient selected station, whereas the grid tariff must reflect the average cost of energy to the Board within an area. This includes generating costs at less efficient stations and overhead expense at selected stations used only for peak-load purposes, if at all.

or the actual costs of the energy so sold cannot be approximated until the receipts from sales at adjusted station costs, less any rebates under Section 13, have been figured. But both of these are variables depending upon the operating program, the efficiency of each station, and the development of load by the *particular* undertaker owning the selected station in question.

Assuming these difficulties solved, the grid tariff could be calculated from the estimates of costs to be recovered and sales to be made at the tariff. But bearing in mind that consumers on the tariff are restricted in practice to purely distributing undertakers, owners of non-selected stations or of selected stations so inefficient as to be used for peak load only, there are certain general principles that must apply. (1) A practical upper limit is fixed for the kilowatt-hour charge in each area by the danger of Section 13 appeals, and the necessity to provide a rate which will permit competition of public supply with other sources of power. (2) The tariff must approximate existing temporary arrangements and must not prejudice the position of small undertakings operating in new and sparse areas where load factors are poor. The latter would be handicapped by a kilowatt charge weighted with a proper allocation of the Board's overhead expenses and an energy charge graded to give promotional effect, because the small customer's load would necessarily fall within the higher priced brackets. (3) The tariff is a *district* tariff and therefore it could not be made to vary with transmission distance, especially as the actual distance at any time is within the Board's control.

For these reasons a "scientific" promotional tariff was avoided. The essentials of the grid tariffs thus far adopted are shown in Table I. The form is standard for all area tariffs and, even in the actual amounts of the charges,

TABLE I. COMPARISON OF GRID TARIFFS.*

Annual Fixed Charge per Kw. of Maximum Demand on the Board at Each Point of Supply	Central Scotland	Mid-East England	South East and East England	North East England and North Wales
Basic demand	£3 10 0	£3 10 0	£3 10 0	£3 7 6
1st Standard increment	£3 5 0	£3 5 0	£3 5 0	£3 3 0
2nd Standard increment	£3 0 0	£3 0 0	£3 0 0	£2 18 6
Excess	£2 15 0	£2 15 0	£2 15 0	£2 14 0
Variations of kw. charge				
Power factor: Increase of annual kw. charge per .1 below .85 lagging	4s.6d.	4s.6d.	4s.6d.	4s.6d.
Rates (taxes): Basic rate per kw. of plant installed at selected stations	6s.0d.	5s.3d.	4s.3d.	4s.0d.
Variation of annual kw. charge per 1s. variation from basic rates	±1s.10d.	±1s.10d.	±1s.10d.	±1s.10d.
Running charges:				
Per kw. hr.	.2d.	.186d.	.21d.	.2d.
Variations for fuel:				
Basic cost per short ton	13s.6d.	13s.0d.	16s.0d.	15s.0d.
Basic calorific value (B. T. U.'s per lb.)	11,000	11,500	11,500	11,600
Variation of kw. hr. charge per 1d variation from basic cost of fuel at basic calorific value	±.001d.	±.001d.	±.0008d.	±.0009d.

* *Source:* C. E. B., 6th *Annual Report*, 1933, p. 27.

Translation of English rates into American equivalents must be approximate. Since utility rates are relatively inflexible, such a calculation may be made at the old par of exchange. (£1 = $4.86; 1s = 24.3c; 1d = 2.025c.)

there has been little variation. It will be noted that the kilowatt charge is graded but the number of kilowatts in each of the first three blocks varies with the "basic" and the "standard increments" of demand, a principle which I believe foreign to American rate practice. The basic demand fixes the first block and is equal to the actual maximum demand on the undertaking in the year prior to the declaration of the tariff, or 2000 kws., whichever is larger. This actual demand in kilowatts performs a double function. It constitutes the initial block for which the maximum kilowatt charge will be made and it is the key for the determination of the next two blocks, the standard increments of demand, which vary inversely with the size of the basic demand.[54] If, in the year prior to the declaration of the tariff, an undertaker supplied to feeders a maximum demand of 2,700 kws., under the tariff (See note 54) his first three blocks would be 2,700, 3,000 and 3,000 kws., respectively, whereas if this initial demand were 19,6000 kws., his first three blocks would equal 19,600, 1,300 and 1,300 kws. Note especially that the first block is determined by the maximum demand *on the undertaking*. Should the undertaker take but a partial supply from the Board, his actual maximum demand on the Board might be less than this basic demand. Nevertheless, he would be billed at the highest kilowatt price for his actual maximum demand up to the amount of his basic demand. Once determined, these blocks remain inflexible so long as the tariff is in effect. This means that the number of kilowatts in each block may be different for each undertaker taking energy at the grid tariff. For kilowatts of maximum demand on the Board in excess of the basic demand plus two standard increments, the buyer is billed at the minimum price per kilowatt under the tariff.

The demand charge is made to vary with power factor at the time of the undertaker's annual maximum demand on the Board's system.[55] It is also

[54] This may be best indicated by a partial table as follows (C. E. B., Tariff for the Mid-East England Area, November, 1932, p. 2):

Basic Demand (Kws.)	Standard Increment of Demand (Kws.)
Minimum of 2,000 but not over 3,000...	3,000
Exceeding 3,000 but not over 4,000.....	2,900
Exceeding 4,000 but not over 5,000.....	2,800
Exceeding 5,000 but not over 6,000.....	2,700
.....	.....
.....	.....
Exceeding 20,000 but not over 21,000...	1,200
Exceeding 21,000 but not over 22,000...	1,100
Exceeding 22,000.....	1,000

Basic demand from 2,000 to 22,000 kws. is divided into steps of 1,000 kws. which are accompanied by inverse variations of the standard increment in steps of 100 kws., ranging from 3,000 to 1,000 kws. If the basic demand exceeds 22,000 kws., the standard increment becomes and *remains* for any higher basic demand, 1,000 kws. For any basic demand not exceeding 3,000 kws., the standard increment is 3,000 kws., but under no circumstances can the first block of kilowatts be less than 2,000.

Thus, if maximum demand on the undertaking were 1,200 kws. in the year preceding the adoption of the tariff and this were likewise the maximum demand on the Board under the tariff, the undertaker would be billed at the highest kilowatt price until his actual demand had increased to 2,000 kws., the minimum initial block. Kilowatts in excess of 2,000 would be billed at the price applicable to the first standard increment; in excess of 5,000, at the price applicable to the second standard increment; and in excess of 8,000, at the minimum kw. charge under the tariff. In other words, the first three blocks would be 2,000, 3,000, and 3,000 kws. respectively.

[55] The clause involves a fixed addition to the kw. charge for each 0.1 by which power factor falls below 0.85 with no compensation for improvement above this standard. Hence it is not theoretically correct, but such an adjustment was impossible anyway because of the lack of operating data and the fact that extra payment by the Board on generating account for this cause could not be calculated. If excess capacity in one-shift stations were available, the extra cost would be minimal; if base-load stations had to be called upon, it

(Footnote 55 continued on page 371)

subject to additions or deductions at a fixed rate for variations in the average amount payable for rates (taxes) at selected stations during the year.[56] The running charge per kilowatt hour is made up of two separate computations: (1) the estimated average running costs per kilowatt-hour at selected stations in the area over the tariff period; and (2) the Board's total expenses in each area, excluding costs of generation, averaged over the total kilowatt hours estimated to be sold.[57] The resultant demand and energy charges in the grid tariff do not reflect a scientific allocation of overhead and running costs but rather the practical considerations pointed out in a preceding paragraph.

The grid tariff contains a provision for a service charge (not yet enforced in any operating area) which may be levied against an undertaker for each additional point of supply from the grid *after* his first.[58] The amount of the charge (if any) is to be fixed by the Board having regard to available transmission capacity, extra costs involved, nature of the supply and any attendant special circumstances. Finally, the Board reserves the right to quote special prices to enable authorized undertakers to negotiate with consumers for exceptional supplies where it is satisfied that special circumstances exist.

Two aspects of this tariff are significant. First, it is a peak responsibility tariff. An undertaker who purchases his energy at the tariff pays the annual charge for those kilowatts taken during

(*Footnote 55 continued from page 370*)

would be considerable. The effect of the power factor clause is practically identical with calculations made for the Scotland area to determine the significance of power factor variations for transmission lines and equipment only. The clause is identical in all tariffs thus far issued by the Board and I therefore conclude that it applies only to investment in the grid. This distinguishes it from the power factor clause used in determining adjusted station costs which applies to investment in generating plant.

[56] This was required because of the hazard that municipalities owning base-load stations (thus exporting a large proportion of their kws.) and those owning peak-load stations (thus taking all energy at grid tariff) might be tempted to burden the area with a portion of their municipal expenses. As the rating authority, a municipality could increase the assessment of the station or the percentage charge on the existing assessment. In the first instance noted, part, and in the second, all of the charge would be passed on to the grid.

[57] This second element in the charge is identical with the addition made to the price of kws. sold to selected station owners at adjusted station costs. It should be noted that the variation of the kw.hr. charge contained in the coal clause conceals an extra allowance to cover variations in wages. This is included to simplify the tariff, and because it is assumed that in the long run wages follow commodity prices and the price of coal constitutes a reasonable index of the latter.

[58] Supply will be delivered to an authorized undertaker at any point at which any service apparatus of the Board is installed and at any pressure available at the terminals of such apparatus or at any other point or any other pressure at which the resulting expense to the Board is reasonable relative to the supply, or, if unreasonable, upon payment of such sum (in addition to tariff rates) as may be authorized by the Electricity Commissioners. The system is 3-phase, A. C., 50 cycles and all variation in pressure and frequency is subject to the regulation of the Commissioners. Anticipated maximum demands for each of the first five years of the supply must accompany each application and on each January 1st the undertaker must give written notice of maximum demand in the following December which cannot be exceeded at any time by more than 20% without three months' notice. Service apparatus (with the largest transformer out of service) is provided of sufficient capacity to handle the load so required, and the taps on every transformer of not less than 2,000 KVa. capacity are arranged for pressure regulation while on load. Limits within which the undertaker may vary his pressure are fixed after consultation with the Board. All service apparatus is constructed, arranged, and used by the Board as part of its general transmission system and is operated under its regulations and orders. Other technical details, such as metering systems, indemnity for damage, and the like, are not considered necessary to a broad understanding of the grid tariff. (C. E. B.: General Conditions for the Supply of Electricity at the Tariff, November, 1932.)

It will be noted that point of supply and pressure of supply are variables which are not reflected, so long as they are "reasonable", in price to the consumer. Since the Board's customers are authorized distributors only, they request pressures which fall in practice within the limits of acceptable primary distribution voltages. The cost of transforming to "reasonable" primary distribution voltage is borne by the Board.

his highest half-hourly demand on the grid as registered in any half hour during the four peak months of January, February, November, and December. By demand *of any amount* during the other eight months of the year, his billed demand is unaffected. Only the kilowatt-hour charge varies from month to month with actual consumption. This undoubtedly stimulates the development of off-peak load but it has the inherent weakness of its type. The building of load, especially large power, may cause the peak to shift in time, as American experience has indicated. If a shifting should require investment to meet a *summer* peak on the system as a whole, the tariff would fail to cover overhead costs. Hence, once sufficient diversity is developed and there is no longer excess capacity in the system, we may expect an alteration in the grid tariff.[59]

Second, the kilowatt charge in the grid tariff is not comparable to the usual promotional block rate familiar in American practice, in which ability to reach the lowest charge is determined by the absolute magnitude of the load. The rationale behind the blocking of the demand charge was not primarily a consideration of costs, although it was appreciated that economies are possible in the larger stations with improved capacity factor and it was calculated that with higher utilization all area costs could be covered at the minimum kilowatt charge. Nor was its object promotional in the usual sense of the term, for it is discriminating in its application. This follows from the insertion of variously sized blocks (through the method of determining basic and standard increments of demand) which condition the price per kilowatt of demand not so much upon the existing magnitude of the demand as upon the kilowatts added after the tariff is put into effect. The fundamental objective I prefer to call "developmental." Consistent with the conception of rationalization as a national project and the grid as a medium for the introduction of a new era in which electrical energy is to be freed from localization and made equally available throughout Great Britain, the framers of the tariff sought to equalize the advantages of small and large undertakings, of sparse and dense areas of supply, through the blocking of the demand charge, and at the same time to encourage *new* promotional effort by facilitating a rapid attainment of the minimum kilowatt price. Their underlying assumption is that the size of existing demand measures the progressiveness of the manager, that it is likely to be correlated positively with the degree of intensive development in his area, negatively with the remaining untapped load.[60]

Large consumers, therefore, are

[59] Both this and the following point are significant only in a long-run analysis and have little immediate importance. Although some 70% of the factories in the country are electrified, those on public supply mains have poor load factors (they are usually single-shift plants), while only a start has been made in securing for public supply such heavy and continuous loads as paper, chemicals, coal mining, glass, iron and steel. Some system of joint operation with the owners of very large industrial power stations is almost a condition precedent to extensive conversion. Important rural loads, for such activities as land reclamation, water pumping, and drainage are yet but potentialities and industrial decentralization is a slow process, while railway electrification is likely to await better economic conditions. Immediate markets are discovered in the intensive electrification of the home, possibly in central heating, and in the extension of electricity to new consumers. It will be appreciated, therefore, that load development is not likely to tax generating capacity in off-peak periods within the next few years.

[60] This is not strictly accurate for the tariff is a compromise. It was appreciated that small undertakers might experience more difficulty than large ones in adding equal *absolute* numbers of kws. to their load but less difficulty in gaining an equal relative increase. However, the assumption of a correlation between progressiveness and existing demand seems gratuitous in view of later studies. (See below pp. 384 ff.)

assumed to be in one of two situations. Either they are more progressive, in which case their demand on the Board will represent a higher annual load factor, or their areas are larger or more densely settled, in which case there is a greater potential diversity of demand among possible customers and a better opportunity to develop a high annual load factor. In either event they could afford to pay the highest kilowatt charge on their existing maximum demand. Consequently, this demand upon their undertaking (not upon the Board) fixes their basic demand (the number of kilowatts up to which actual demand on the board will be charged at the maximum rate). But since any increase in their load may prove more difficult and more likely to come across their peak, the size of the next two blocks (the standard increments) should be correspondingly small to permit a more rapid approach to the minimum kilowatt charge. On the other hand, if the undertaker with small existing peak demand may be assumed unprogressive, his standard increment of demand should be larger for there is more potential load, while his basic demand should be less since his territory is likely to be either smaller or more sparse and the potential diversity among his customers therefore lower. Thus the grid tariff differs essentially from American rate schedules in that it attempts to equate the advantages of large and small customers. With uniform block prices, it imposes various sized blocks of kilowatts determined not by the demand on the Board but by the demand on the undertaking,[61] while a flat kilowatt-hour charge averages the advantage of increment costs among large and small utilities alike.

An evaluation of the effect of the tariff upon undertakings of various sizes over a period of time is rendered problematical by the fact that the tariff is applicable to *annual* peak demand only as registered within four months. In terms of the average cost of kilowatts to the undertaker, a very simple calculation will show that the undertaking with a large demand at the time it becomes subject to the tariff will suffer a distinct and *permanent* disadvantage in comparison with the small undertaking, as their respective peak demands increase by equal absolute amounts. In fact, to attain the same average costs per kilowatt as an undertaker with a basic demand of 3,000 kws., a distributor with a basic demand of 22,000 kws. must add to his demand on the grid kilowatts roughly in the ratio of two to one in the early stages of development, and over three to one in the later stages. Once the former has increased his demand to, say 27,000 kws., the latter can never add a sufficient number of kilowatts to attain the same low average. This result is equitable only if we can assume that the relative maximum demand on undertakings at the time of the tariff is positively correlated with the potential annual diversity and the potential development of load in their respective areas. In so far as this is not true, I need not labor the point that it will lead, in the long run, to discrimination in favor of the undertaking initially small.[62] In

[61] Eventually, maximum demand on the Board will equal maximum demand on the undertaking. Meanwhile, where only partial supply is taken from the grid, the use of the grid supply for cheap stand-by is prevented by requiring that billed demand shall not be less than ⅔ of the number of kws. for which notice has been given.

[62] It is appreciated that rates quoted ultimate consumers are not specifically determined by average costs but must be modified by the diversity of the particular load relative to the system peak. It is merely contended that as annual load factor in two undertakings approaches equality, a difference in average cost of energy *is determining.*

this sense the tariff is a developmental tariff and, as such, an unscientific tariff for permanent application. One of the major objectives of rationalization—namely, the *redistribution* of industry on a plan of decentralization—will promote this type of discrimination. As indicated elsewhere, the Board itself is instrumental in the negotiation of such contracts. These activities may mean that by 1943 disparities in the average cost of kilowatts under the tariff will bear little relation to the progressiveness of the managements concerned.

Finally, a literal application of the tariff might conceivably hinder the development of sparse areas or lead to an uneconomical paralleling of grid lines. Assume an undertaking taking its supply from the grid at a single point A at such a stage of development that additional kilowatts of maximum demand will be billed at the minimum rate (£2.15.0 per kw.). The grid lines, say, pass through a sparse area B which our utility contemplates serving either through A (by means of extension of its own transmission system) or through a second point of supply from the grid at B. Were the maximum demand at B 1,000 kws., the second alternative would cost £750 per year more than the first, ignoring any diversity which the utility might get on the first alternative and which would therefore enhance the extra cost of the second.[63] But an undertaker becomes liable for a service charge on each point of supply after the first. This might easily increase the extra cost by £2,000. Before additional kilowatts of maximum demand at B could be purchased at the minimum rate under the tariff, the maximum demand at B would have to be increased by 7,000 kws. (to a basic demand of 2,000 kws. and two standard increments of 3,000 kws.) at which time, again ignoring diversity but assuming a service charge of £2,000, the extra cost of the second alternative would have mounted to £5,750 per year. Capitalizing at 10%, this would permit a *minimum* investment in transmission line paralleling the grid, initially of £27,500, ultimately of £57,500.[64]

Paralleling the grid lines is not necessarily economic waste. Obviously, 132 kv. lines are transmission and not distribution media and too frequent tappings bring operating difficulties as well as excessive cost, although the latter is reduced by fuse tapping. But this is not equally true of secondary lines and the grid system includes approximately 1,000 miles of line operating at 66 kv. and lower voltages. Furthermore, there is a social gain in extensions made by undertakers as opposed to grid taps for in this way *intermediate* loads, uneconomical in themselves, can be supplied. Nevertheless, it is desirable that obstacles to the development of sparse areas and the absorption of small undertakings be removed and that inherent sources of discrimination be eliminated. This would be promoted by reducing the financial obstacles to multiple points of supply from the grid. The calculation of basic and standard increments of demand independently at each point of supply is needlessly restrictive. A minimum demand and service charge are adequate to protect the Board's interests, and any small loss in diversity, the benefits of which are now

[63] Cost of the supply on the second alternative would be 1,000 kw. at £3.10.0, or £3,500; of the first, 1,000 kws. at £2.15.0 or £2,750. Obviously were there any diversity the number of kws. for which the utility would have to pay (if taken at A) would fall below 1,000, while the grid charge at B would be unaffected.

[64] The principle, not the actual figures, is important here, although the figures are rendered conservative by ignoring diversity under the first alternative. The service charge has not yet been enforced in an operating area.

retained by the Board, should be compensated by more effective load building and less chance for discrimination.[65]

I conclude that the present grid tariff is a temporary expedient adapted to an initial state of development and capacity. As a compromise adjusted to a transitory stage of load development, it conceals the seeds of discrimination between large and small undertakings, it encourages an uneconomical paralleling of grid lines, and it may ultimately fail to cover overhead costs. It cannot endure longer than the conditions which produced it. The present basis of the Board's commercial operations is far too cumbersome and involves too many estimates based upon hypothetical assumptions to permit an efficient attainment of the ends of rationalization. This is especially apparent in its relations with selected station owners. The complexity of a system which provides three possible prices to such purchasers has been noted. That it obstructs the adoption of the most efficient operating program and threatens further discrimination between the Board's customers will be indicated in the following section.

B. Operating Problems.

There is a core of weakness in the British plan which endangers its success at all points whatever the problem at hand, whether operating schedules, rate-schedules, or load building. This has become dramatically evident in the Scottish area and I draw, therefore, upon an intensive analysis of that section. Peculiarities in this district may exaggerate the manifestations of this weakness, but they can hardly account for them entirely.

Unique features of the Central Scotland area should be borne in mind. It was the first scheme to be adopted and construction of primary lines was completed as early as January 12, 1931. These were in operation by the last of August in that year, but no grid tariff was declared and consequently selected generating stations were free of the Board's control until January, 1933. This delay was necessitated by the change of frequency in the west of Scotland. Meanwhile the Board's District Manager could negotiate only voluntary temporary agreements with the owners of generating stations and the scheme suffered loss of prestige on four counts. (1) While change of frequency was in progress the load on transformers and lines was negligible and there developed a fifth harmonic component in the current whose high frequency burned out condensers and gave rise to other operating troubles.[66] (2) At a time when growth in demand was confidently expected, the C. E. B. negotiated two agreements with the Grampians Electric Supply Co. in North Scotland for hydro-electric power to be used in the Central Scotland area. Delivery on the first at the Board's substation at Abernethy —a guaranteed demand of 12,000 kws. at 50% annual load factor with definite monthly quotas—began on November 30, 1930, while the second increased the demand to 24,000 kws. under similar conditions after December 31, 1933. Not only was the amount of energy considerable but the prices were not a bargain relative to generating costs at first class steam stations. In 1931 and

[65] Compare the advantages of the owners of more than one generating station interconnected. Here the stations are selected as a group and, although separately metered and separately connected to the grid, they are a single point of supply for the calculation of imports at the grid tariff. In such cases the *owner* reserves all benefits of diversity.

[66] Today, with greater loading and even without the harmonic absorbers installed to correct it, the effect of the harmonic is negligible—around 2%. In other areas where use of grid lines did not begin under such unfortunate circumstances, it has caused no trouble.

1932 the depression became so acute in Scotland that total demand and total kilowatt-hours sold declined. The existence of this contract with a company outside the area proved a source of irritation to corporations[67] called upon to restrict generation in their steam stations under the Board's operating program. (3) The long period during which the grid lines were available for stand-by purposes and the District Manager had no authority over engineers in control of generating stations led to the establishment of station efficiency records by the latter which would have been impossible under wholly independent operation. This has multiplied disagreements over an efficient operating program.[68] (4) Finally, a non-cooperative policy on the part of the major company undertakers in the area has been encouraged through company control by Mr. George Balfour who actively opposes rationalization in Great Britain and led the attack in Parliament against the legislation both of 1919 and 1926.

Granted then that the case of Central Scotland is exceptional, it still remains true that, up to the summer of 1933, only in Scotland were the vital issues of the operating program raised. Obstacles to cooperation are more deeply rooted than the conjuncture of factors noted above. Few undertakers welcome a scheme of rationalization which at once relieves them of control of generation and takes away the differential advantages they may have gained in this way. This attitude is intensified by the mutual animosity of local authorities and company undertakings. Judging from interviews with 43 undertakers, including managers of some of the largest and smallest of both local authorities and companies, the electricity supply industry in Great Britain is manned by engineers rather than commercial managers, and dominated by the "generation" rather than the "commercial" point of view. They resent the absorption of what has been their life work and are unwilling to admit that the grid will be of service to them. This is markedly true of local authorities where cessation of generation is feared as a move to reduce salaries and employment. Companies dread a plan which will make available to corporations, operating on a no-profit basis in more desirable territories, energy at costs comparable to their own. Generating efficiency often compensated for higher capital charges and sparser areas. The grid levels the advantage over a wide area at the same time that it stimulates demand for tariff reductions. Corporations refuse to accept an operating program which makes for higher load factor on a company station even though more efficient.[69] Both are loath to surrender any differential advantage they may possess.[70] Owners of selected stations attempt to shoulder the area with their private burdens.[71] Obstructionist tactics had so far blocked

[67] "Corporation" will be used in this paper in its English sense to denote an incorporated political unit such as a municipality, a Rural District Council and the like, as opposed to a private corporation, designated by the term "company".

[68] Cases in point are the Portobello station of Edinburgh Corporation and Bonnybridge station of the Scottish Central Power Co.

[69] For example, the Scottish operating program had to be altered to provide a better load for Glasgow's Dalmarnock station at the expense of the Clyde Valley Power Co.'s Yoker station.

[70] E. g., Edinburgh Corporation in 1932, after years of development, attained costs of production equivalent to a tariff of £3.10.0 per kw. plus 0.2d per unit. This is now offered wholecloth to such an outlying area as Dumfriesshire.

[71] One aspect of this may be noted. Where corporation councils are largely made up of labor members, it is difficult to get agreement on proper staffing of generating stations during a period of unemployment. If the corporation owns a selected station, all the ex-

(Footnote 71 continued on page 377)

TABLE II. SELECTED STATIONS AND TEMPORARY ARRANGEMENTS AS PROPOSED AND ADOPTED IN EACH SCHEME AREA.*

Scheme Area	Date Submitted to C. E. B.	As Proposed by Electricity Commissioners			Date Adopted by C. E. B.	As Adopted by C. E. B.		
		Selected Stations		Temporary Arrangement Stations		Selected Stations		Temporary Arrangement Stations
		Existing	New			Existing	New	
†1. Central Scotland	Mar. 24, '27	10‡	2	14	June 29, '27	10	2	14
†2. S. E. England	Sept. 20, '27	13	5	43	Feb. 15, '28	31	4	39
†3. Central England	Mar. 9, '28	18	1	24	May 22, '28	19	1	24
†4. N. W. England and N. Wales	June 13, '28	27	2	35	Oct. 12, '28	27	2	35
†5. Mid-East England	Dec. 28, '28	18	..	22	Mar. 19, '29	16	..	22
6. N. E. England	June 3, '29	6	..	11	Jan. 22, '30	6	..	11
7. S. W. England and S. Wales	Dec. 30, '29	6	2	17	June 3, '30	7	2	17
†8. East England	Mar. 31, '30	2	..	3	July 31, '30	2	..	3
9. South Scotland	Dec. 8, '30	1	5	8	July 31, '31	1	5	8
TOTAL		101	17	177		119	16	173

* Compiled from published memoranda on each scheme as proposed by the Commissioners and adopted by the Board.
† Areas for which grid tariffs have been declared.
‡ Of these, four were proposed for temporary selection only.

effective administration in Scotland by the spring of 1933 that the District Manager was contemplating the permanent adjournment of the Technical Consultative Committee.[72]

Keeping this narrow attitude in mind, let us turn to the more objective difficulties in the way of efficient operation. Fundamental is the number of selected stations. The Weir Committee anticipated that by 1940 public supply would be generated from 28 major and 30 secondary stations in lieu of the 438 operating in May, 1925.[73] A glance at Table II will indicate how partially this end has been realized. There will be over 2.3 times as many selected stations as were contemplated by the Weir Committee, excluding many non-selected ones with which the Board has made agreements for operation under similar status up to seven years.[74]

Since all costs connected with selected generating stations are paid by the Board no matter how much or how little the station may be used, and a

(*Footnote 71 continued from page 376*)

penses of which consequently fall to the Board, but is taking energy at grid tariff, it may be almost impossible, for increased expense falls on the Board while increased unemployment falls upon the parish tax rates.

[72] This Committee, whether national or district, is made up of representative undertakers and provides a medium for unofficial consultation with the supply industry. It is not required by the 1926 Act.

[73] *Report of the Committee appointed to review the National Problem of Supply of Electrical Energy*, 1926, p. 9.

[74] In South East England 16 such agreements had been made by June, 1933, each for seven years, and it was expected that others might be added. There is one in Mid-East England for a shorter term, and others are likely to be made as new areas approach operation.

In actual operation, of course, the picture would differ greatly from the table here presented. For instance, in the scheme areas starred (those for which grid tariffs have been declared), which are responsible for about 84% of the total energy generated in the country, about 34 base-load stations will take the bulk of the load, leaving some 74 to work on two-shift and peak-load schedules. (The total number of selected stations for these areas (108) differs from that indicated above because one new station has been brought into commission in South East England, Central England, and North West England and North Wales respectively.) In Central Scotland and Mid-East England, which operated under tariffs through 1933, 10 out of the 25 coal-fired selected stations produced 76% of the kw. hrs. supplied by the Board. (C. E. B., *6th Annual Report*, 1933 p. 11.) Effective operation will probably lead to even greater concentration upon base-load stations.

station cannot be de-selected without the owner's consent, an unnecessary number of stations becomes a financial burden on technical efficiency. The dead weight of fixed charges upon unutilized capacity in stations which, even with growth of load, may be used for peak periods only, tends to reduce the economy of base-loading in an interconnected system.[75] This is a flaw so patent that it calls for explanation.

Under the Act, stations were selected at the time an area scheme was adopted. Six years in advance of operation, with inadequate station records and only an estimate of possible load requirements, technical considerations (availability of condensing water and fuel, limitations of the site, capacity relative to load center, and the like) could not be exclusive determinants. Cooperation, at least sufferance, from skeptical undertakers was essential. Objections to dependence upon a foreign station or group of stations through a transmission line which was yet but a blue print, municipal pride which would not brook dependence on a company—such considerations could not be ignored, especially at the outset. In consequence, there are selected stations which many engineers cannot justify on technical grounds but I have found no non-selected station the selection of which could be warranted.

More crucial than the above are hindrances arising from the Act itself. It is an elementary observation that economies of rationalization cannot be fully realized until the load upon the interconnected system is adequate relative to its capacity. But neither the Board nor the Electricity Commissioners can force an undertaker to close his own non-selected station and take bulk supply from the grid unless the grid tariff can be shown to result in a price "substantially" less than his generating costs in the next subsequent year, excluding capital charges on the station, and unless the C. E. B. undertakes to give him a supply on specified terms for a period of at least seven years.[76] This does not provide a true economic test of the relative desirability of supply from the grid and that from an independent generating station. Only if the generating costs, excluding capital charges, at an independent station (or group of stations) proved less than the Board's total costs of supplying that load (or those loads) in combination with its existing system load, would the maintenance of the independence of that station (or group of stations) be

[75] At this early date it is not possible to say whether overhead charges will absorb the economies of base-loading. The first full year of grid operations (1933) in Mid-East England and Central Scotland is highly encouraging with a combined surplus on revenue account of £6,750 excluding interest and sinking fund (equivalent to depreciation in American parlance) on the Board's capital expenditures in these areas. (C. E. B., *6th Annual Report*, 1933, p. 22.) The Board's report does not permit an accurate determination of these items by areas. However, since the average cost of capital is roughly 5% and depreciation is handled in a fund accumulated at 3½% compound interest, 8½% on the capital expenditure is likely to err on the side of conservatism. On June 30, 1933, the combined amount actually paid out on capital account was £3,744,057, (£158,380 less than contracts certified for payment and £569,418 less than contracts approved). Taking this as the amount upon which a full year's interest would be payable, full capital charges would total roughly £318,245, indicating a combined deficit of £311,495. This deficit must be compared with the £671,657 which the C. E. B. contemplated losing in the first year of operation in these areas when the grid tariff was calculated. Against it also must be set the fact that the Board was able to meet an increased output in kilowatt-hours of 10.9% over 1932 without any additional capital expenditure on generating plant which would have been required in the absence of the grid.

This approximation takes no account of capital charges on change of frequency investment. This is proper since the standardization of frequency at 50 cycles will be reflected only partially in grid operations. Far more important will be its effects upon the cost and utilization of motors and appliances. For this and other reasons previously indicated, these capital charges are recoverable from the Electricity Commissioners.

[76] Electricity (Supply) Act, 1926, § 14.

economically justified. Obviously the grid tariff, as constructed, together with the inability of the Board's District Manager to make special prices based upon the diversity of an undertaker's demand, render the application of a true economic test impossible. This provision of the Act (Section 14) is a sop to vested interest, and it is doubtful whether, under it, the Board could close over 5% of the non-selected stations in the whole country.[77]

Failing this, there were but three alternatives if adequate system load were to be secured: (1) selection of the station with the object of ultimate scrapping; (2) temporary selection, a voluntary agreement which accords that station selected-station status for a limited period only; (3) a voluntary, long-term agreement to supply energy at a guaranteed saving over independent operating costs. The last would lighten the burden of overhead costs during the early years of excess capacity but it involves difficult negotiations upon hypothetical future costs which make it impractical. The first two alternatives increase the Board's overhead expense without extending its control over really efficient generating plant.[78] Growth of load may ameliorate, and amortization of capital charges on inefficient selected stations will eventually remove, this subsidy to vested interests.[79]

Another knotty problem is to determine a proper operating program for an area. Technically, this should be simple. Within limits imposed by security, continuity of supply, and transmission costs, the most efficient stations should operate at load factors as near 100% as demand and necessary overhauling will permit. But no such straightforward solution is possible under the 1926 Act, for it would allocate savings disproportionately to the owners of base-load stations with no corresponding advantage to the Board. It has been explained that the owner of a base-load station will purchase his energy from the Board at adjusted station costs, for the latter will be necessarily lower than the grid tariff (see above, p. 368.). The adjusted station cost (his purchase price) falls below generating costs under independent operation as his station load factor is improved beyond that possible had there been no grid, for average kilowatt-hour costs are lowered and overhead charges per kilowatt are reduced as kilowatts, each

[77] The Board has made no attempt as yet to force the closing down of a generating station under § 14, although special terms have been established to induce partial de-selection of selected stations in some instances, e. g., two stations owned by the London Power Company. It should be noted that the forced closing of a station would involve the C. E. B. in compensation payments to labor thereby displaced. (*Ibid.*, § 15.)

[78] It will be noted in Table II that the South East England area is the one in which the greatest difference occurs between the proposals of the Electricity Commissioners and the adoptions by the Board. Several factors dictated this. The Board was more optimistic as to the growth of load in the area, and, in view of existing interconnection among power company stations in the London Area, it anticipated greater difficulty in showing a margin of savings which would induce non-selected stations to come on the grid. It should be remembered too that there are more non-selected stations in this area than elsewhere; even as finally adopted, the scheme left 104 undertakings in this category. Consequently, to give greater flexibility in operation, the Board selected 15 stations with which the Electricity Commissioners had suggested temporary selection, together with three others. As previously noted, even this did not provide adequate assurance of system loading and seven-year arrangements were made with 16 additional undertakings. (Electricity (Supply) Act, 1926. *Memorandum on the South East Electricity Scheme*, 1927, as adopted by the Central Electricity Board, pp. 2-4.)

[79] Growing utilization of grid capacity and rising load factors on base-load stations may be expected to widen the difference between the Board's prices for energy and the generating costs of independent plants in favor of the former. This will stimulate the voluntary closing of the latter and permit a wider use of mandatory action under § 14.

bearing a portion of such costs, are exported to the grid.

These savings, which increase as load is concentrated, are not shared equally by the Board and the station owner. The Board is not relieved of capital charges on inefficient selected stations held as spare plant. Far more important is its responsibility for a middle group of reasonably efficient selected stations. If these stations are not loaded so that adjusted station costs are lower than the generating costs, under independent operation, of the owners' actual distribution requirements, these owners will become entitled to pay for their supply, not at grid tariff, but at the estimated cost of generating their own requirements. Every successful application of this provision (Section 13) increases the Board's cost of operation and consequently makes more appeals likely. Thus, an operating program is derived, not from a calculation of grid operating efficiencies, but from an estimate of independent operating costs for each selected station in the area. The Board must maintain a mean between two extremes: limiting load upon the most efficient stations lest they absorb the lion's share of the savings, giving sufficient load to the fairly efficient stations lest they earn the right to a rebate. The operating program becomes a nice calculation of estimates and variables in which financial rather than engineering considerations control.

The use of adjusted station costs, coupled with the right of appeal under Section 13, to determine the price of energy to selected station owners is not only pernicious, for it stimulates the parochial spirit and sets each selected station owner against the rest that he may shift a growing portion of his overhead charges on to the grid, but it is also discriminatory. The theory that the owner of a selected station should receive his energy at adjusted station costs, even though these reflect a load factor which he could never have obtained under independent operation, is tantamount to capitalizing the strategic advantage of his situation against the area as a whole. This will become more evident when the growth of area load requires construction of new stations of a size and efficiency which local load might never have justified.[80] True, the Board's control over operation is final. By judicious manipulation of station imports and exports its operating engineer may adjust or even absorb savings to an undertaker despite extensive use of his station.[81] But this alternative makes neither for efficient operation nor good will.

[80] The Board cannot *own* a generating station except when "they are unable to enter into an arrangement with any such authorized undertakers for the provision of any such new station on reasonable terms." (Electricity (Supply) Act, 1926, § 6.) Broadly interpreted, this would enable the Board to forestall by contract a disproportionate absorption of savings by an undertaker in the case of a new station, but the section is ambiguous. It is logical that stations built *after* the adoption of a scheme, designated by the C. E. B. (which pays their capital charges) for purposes of the area as a whole, should be *grid* stations. On this interpretation, it is conceivable that the undertaker entrusted with their construction and operation should take his own requirements at *grid tariff* rather than adjusted station costs. In such a case the position taken above must be modified. The undertaker's advantage would be confined to such incidental benefits as local employment, local taxation (so long as generating stations are not covered by the Derating Act), and intangibles such as prestige. The problem is important for the future operation of new stations such as Tir John North at Swansea, the Fulham Station in the London area, and the hydro stations on the Galloway Water Power Scheme. It is even more significant in cases such as Battersea Station of the London Power Company and Ironbridge of the West Midlands J. E. A. where the stations were scheduled when the area schemes were adopted.

[81] This follows from the fact that adjusted station costs are applicable only to such energy as is actually produced at the station *at the time* it is demanded by the undertaker. Imports from the grid are charged at grid tariff. In practice, such manipulation has not been attempted.

Three sources of inefficiency, discrimination, and possible litigation are attributable to the 1926 Act itself: (1) heavy overhead expenses, resulting from the circumstances under which stations were originally selected and the subsidy required in practice (because of Section 14) to insure proper system loading; (2) adjusted station costs as a method of fixing price to selected station owners (required by Section 7); and (3) the contingent maximum price under Section 13. Of these, the first is perhaps least important although it will embarrass the Board during its early years of trading, especially since the prejudice engendered by the generating point of view is widely held by corporation engineers. The last is impossible and will become more unworkable as time goes on. It involves as much hypothetical conjecturing, as much biased and tenuous calculating, as the theory of reproduction cost in the valuation of American utilities at its worst. And, while the Board must look to the future, the undertakers are tempted to adopt "hindsight".[82] This would be a matter of more grave concern were not the Electricity Commissioners the court of last resort in all appeals under Section 13. But the greatest stumbling block to efficient operation is adjusted station costs.

In explicitly setting out the method of determining adjusted station costs, Parliament provided that this price to the selected station owner should be mandatory, "unless otherwise agreed." Should this prove a loophole for the exercise of discretion on the part of the Board, two possible solutions for the difficulties described remain. The Board might contract with each selected station owner at a price showing him an agreed saving over a period of years. This would have the advantage of eliminating recurrent annual calculations of cost and would provide flexibility in operation by removing the necessity of avoiding net loss to the undertaker in each separate year. But it involves the hazard of future estimates for both parties. On the other hand, selected station owners might contract among themselves to share such net gains as would accrue from year to year on a predetermined basis. This would insure voluntary cooperation of undertakers, for only in a program based upon the highest technical efficiency would the gain be at a maximum. But it does not solve the problem of the rights of non-selected as opposed to selected station owners; it does not provide a basis for the division of pooled gains; and it does not prevent disgruntled undertakers from appealing for rebate under Section 13.[83]

We are left with the conclusion that no permanent solution of the problems raised in this section is possible short of actual repeal or desuetude for those sections of the Act involved. One of two changes may be confidently expected. Either the C. E. B. will become the owner and operator of public gen-

[82] Since grid operation is too short to have provided examples as yet, an analogous illustration may be cited. Change of frequency in North East England required the building of a modern 50-cycle generating station, Dunston B, one of the most efficient in Britain. The North-Eastern Electricity Supply Co. admitted that normal development of load would have required it to build a station of like capacity. Virtually its whole cost therefore was treated as ante-dated capital expenditure recoverable from the Company over the period during which it would have been expended for a like purpose by the Company. By the time the station was opened (in the spring of 1933) estimated growth of load had not matured and the Company was pressing its claim that, as the station would *not* have been required, its cost should be charged entirely against change of frequency funds and consequently recovered from the Electricity Commissioners.

[83] This right is unqualified and it therefore seems that any contract which denied it would be *ultra vires* for the Board.

erating stations throughout Great Britain, as proposed in the original bill in 1919, or the provisions for sale to selected station owners at adjusted station cost or at cost of production under independent operation will be nullified.

C. Problems of Load Development

An interconnected system provides some economies irrespective of the growth of load. For example, capital investment in the extension of private plant may be avoided, low-cost sources of power may be utilized and base-loading will save coal.[84] But in a system with generating and transmission capacity adjusted to a future load of more than twice existing demand, these only partially realize the benefits of rationalization. We have seen that the grid tariff reserves to the Board all advantages from diversity of demand and that the Board's operating engineer can take off-peak kilowatts from a selected station without additional expense. This is only potential profit. It can result in income only when a market is developed. Declining costs with increasing use are too well established to require further proof that the ultimate success of the British plan depends upon marketing efforts.

This prime consideration was ignored in the legislation of 1926.[85] Neither the Board nor the Electricity Commissioners were given direct jurisdiction over commercial matters, and the Board is specifically enjoined against trading with any but authorized undertakers. In practice, this leads to a paradox, for one of the most important functions performed by the Board's officers is that of developing load. Whether because of limited production facilities, restricted vision, technical inability, or mere prejudice, the local undertaker is often refused access to the private records of potential industrial customers. Without these, intelligent negotiation is impossible. In such cases negotiations are often handled entirely by the Board and the supply may be given from its lines and even from its own substation,[86] although nominally and legally energy is supplied by the local distributor.

[84] This is indicated in reports of fuel consumption in the Central Scotland area. In 1931, all coal-fired stations in this area averaged 1.973 lbs. per kw. hr. sent out. In 1932, the 10 stations now under control of the Board achieved an average of 1.79 lbs., whereas during the first six months of 1933 (the beginning of grid operation) the eight stations operated by the Board averaged 1.621 lbs. per kw. hr. supplied to the undertakings, as compared with the tariff estimate of 1.775. Although in May the District Operating Engineer in Scotland estimated that demand on the system for the year would be only about 300,000 kws. as compared to the tariff estimate of 520,000 kws. the saving on coal consumption alone during the year 1933 was expected to exceed £50,000. The record of Mid-East England is similar.

[85] There is a partial exception in § 48. The power to sell electric fittings, wiring, and appliances, previously confined to those authorities which had obtained specific powers in Local Acts, was extended to all local authorities.

[86] Three diverse instances may be noted. (1) the supply to J. P. Coat's Ferguslie and Anchor mills (roughly 12,000 kws.) is given through Paisley Corporation, Scotland. The Company had its own plant at the Ferguslie mill but refused to give any detailed cost figures to the Corporation. The negotiations were handled entirely by the Board's District Manager and final agreement was reached only after the Board agreed to take over the Ferguslie plant and sell process steam to the Company upon an agreed basis. (2) The supply to Stewart and Lloyd's Corby Iron and Steel Co. (some 8,000 kws.) in Central England was not only negotiated by the Board's District Manager but also in the face of passive resistance by the Kettering U. D. C. through which it is given. (3) Negotiations for the supply to the Southern Railway for its London-to-Brighton electrification were taken up by the Company with the Board as early as March, 1929. This supply is given at three points through as many undertakers—Croydon and Brighton Corporations and the Sussex Electric Supply Co., Ltd. Separate contracts were required between each of the undertakers and the Company, as well as with the Board. Electrified service began in January, 1933, but final agreements were not completed with each undertaking: until October, 1932, March, 1933, and July, 1933, respectively, after two years of negotiating. The supply through the Sussex Co. is nominal; it is given from the Board's own substation at Three Bridges.

Upon occasion, the Board has "underwritten" the contract of an undertaker with his consumer.[87]

In the majority of cases the activities of the Board's officers are unofficial; they act as technical advisers or consultants, either at the request of the undertaker or upon inquiry from the potential customer, and no record of their work is to be found in the annual reports. These functions have grown in magnitude in both the central[88] and the district offices and promise to expand as the prestige of public supply grows.[89] Standardization of frequency sometimes contributes to the success of these negotiations. Old motors are replaced with new without regard to depreciation or depreciation reserves and, in the process of change, there is opportunity for better adjustment of motor size to duty and reorganization of drives and layout. Furthermore, in consideration of closing down his private plant and taking his entire supply from an authorized undertaker, a consumer may receive a lump sum payment of approximately 80% of the cost of conversion.[90]

An accurate quantitative measure of the load thus brought on or retained for public supply is not possible. Undertakers seldom admit that equivalent results could not have been obtained through their unaided efforts. An official of the C.E.B. estimated that roughly 400,000,000 kw. hrs. per year, or a demand of about 100,000 kws., had been secured through the good offices of the Board. Discounting for natural bias, it is still obvious that one of the Board's most important functions is load-building.

Nevertheless, the possibility of increasing load on public supply from 224 kw. hrs. per head of population in 1932 to the 500 anticipated by 1943 depends primarily upon the efforts of the 650 authorized undertakers who distribute electricity in Great Britain. Recent years have shown progress. Despite depression, sales to consumers in 1932 exceeded those in 1931 by 710,000,000 kw. hrs., or 7.5%, bringing total units sold to 10,097,000,000 kw. hrs.[91] The 1930 *Census of Production* revealed a progressive rate of electrification in industry but indicated an *existing* potential industrial market of almost 4.2 million h.p. of electric motors still operated from private plant, and over 6.7 million h.p. of prime movers still installed for direct mechanical drive.[92]

[87] In March, 1931, Lincoln Corporation was on the point of losing its largest customer, Ruston and Hornby Ltd., manufacturers of Diesel engines, whose load represented approximately ¼ the Corporation's total output. The Board not only carried through all negotiations with the Company but undertook to supply the Corporation with energy at a price less than *existing* cost to itself. Obviously, the only justification for such a contract was the long-run advantage of the load, otherwise permanently lost, together with the fact that the price would more than cover cost to the Board when the grid came into operation.

[88] In the spring of 1933 the central staff had to be enlarged to deal with this business alone.

[89] This has been augmented by the decision of many outstanding industrialists to come over to public supply; among others, the Austin Motor Co. and the Dunlop Rubber Co. Ltd. (Birmingham), and Colvilles Ltd. with many associated iron and steel works in western Scotland.

[90] The Board would make such payments to the utility in charge of carrying out the change of frequency and recover the disbursements from the Electricity Commissioners as previously indicated for all change-of-frequency operations. The utility, of course, might be disposed to add to the payment from its own funds in view of the prospective load. Only consumers at the date of frequency change are eligible, and the salvage value of scrapped property is added to the frequency fund.

[91] Electricity Commissioners, *13th Annual Report*, pp. 11-13. This progress has continued. Generation of electricity in 1933 exceeded that in 1932 by 10.7% and the first two months of 1934 showed an improvement over the previous year of over 15%. (C. E. B., *6th Annual Report*, 1933, p. 1.)

[92] Electricity Commissioners, *13th Annual Report*, pp. 194-99. The results of the *Preliminary Reports*, subject to final correction, indicate the rate of progress in industrial electrification. In comparison with the inter-censal period 1912-24, the average annual in-

(*Footnote 92 continued on page 384*)

TABLE III. EFFECTIVE RANGE OF ELECTRICAL DISTRIBUTION FOR LIGHTING AND DOMESTIC PURPOSES IN AREAS OF 50,000 POPULATION AND OVER IN GREAT BRITAIN, 1932.*

Classification of Undertakings by Population (Thousands) (a)	Number of Undertakings (b)	Total Mileage of Streets Cabled (All Domestic Purposes) (c)	Percentage of Maximum Mileage Possible (Approximate) (d)	Kw. Hrs. Sold per Mile of Street Cabled (e)	Population per Mile of Street (f)	Sales per Capita per Mile of Street Cabled (Approximate Kw. Hrs.) (g)
A. 400 and above...	6	3,037	66%	129,585	959	135
B. 250–400.....	5	1,245	81	77,503	1,042	74
C. 200–250.....	4	503	91	156,852	1,675	94
D. 150–200.....	7	998	80	93,229	959	97
E. 100–150.....	12	1,157	86	90,310	1,069	85
F. 75–100.....	18	1,612	82	149,271	817	183
G. 50–75.....	15	798	82	79,010	921	86
TOTAL.....	67	9,350	78	114,454	988	116

* Adapted from R. B. MacFarlane, "Distribution and Demand", 74 *Architectural Review* 188-9 (November, 1933). I have calculated column (g). The London area was excluded as unique both from the original study and from this table.

There is no study available which presents an adequate picture of domestic electrification but the conclusions reached in an analysis of the returns from a questionnaire sent to the 150 undertakings serving areas in excess of 50,000 population throw some light on the situation.[93] In Table III one phase of this study is presented. The data cover 27% of the population, 4.5% of the area, and about 40% of the kilowatt-hours sold for private lighting and domestic purposes in Great Britain. Unfortunately this table is far from conclusive. Without some knowledge of the number and economic condition of customers, the consumption per customer in given economic groups, and the number of potential customers (such as the number of homes), it is difficult to evaluate the efforts of the undertakings or estimate the effective range of electrical distribution. It must be accepted as no more than suggestive.

Conclusions reached in the more detailed study are significant and throw light on the table above. The development is extraordinarily patchy but is on the whole less advanced in large centers of population than in those of medium size. The former have often secured outlying distribution rights but have shown little enterprise in opening up new territory. This defect was most notable in Birmingham, Manchester, Liverpool, and Edinburgh. Many undertakings did not even know the mileage of streets in their areas. The study showed a tendency to skim the cream of the existing business without vigorous developmental effort. Examination of the detailed statistics reveals the most efficient undertakings in the country within Groups C, D and E of Table III and the least efficient in Groups B and C (there was an overlapping within

(*Footnote 92 continued from page 383*)

crease (1924-30) of prime movers increased almost 58%, installed electrical generating plant by 100%. In 1930 prime movers for electrical generation had become 67% of the total, having increased 55.4% over 1924, while those for mechanical drive were falling 8.6%. Electrical generating plant installed in electric utilities and railroads was 71.6% of the total at that date, having increased 79.7% over 1924, while that in industry was increasing 20%. While the total h. p. of electric motors installed in industry (exclusive of electric utilities) increased 34.8% over 1924, those driven by purchased energy increased 40.6%.

[93] *Memorandum on Distribution in Urban Centres*, November 17, 1933. This was supplied me by the C. E. B. Replies were received from 100, representing 73% of the total kw. hrs. sold by the undertakings canvassed, but many of these could not be included in any statistical compilation because peculiarities rendered their data non-comparable.

Group C), while the largest centers are again generally less efficient than those in Group D. This conclusion is reinforced by an analysis of the precentage of streets cabled for all domestic purposes. Within Group A not a single undertaking has all its streets cabled. Birmingham and Manchester are exceptionally bad; the former, in view of its size, being one of the least developed areas (for domestic load) in Britain; while Liverpool and Leeds are also very unsatisfactory. Indeed, the small undertakings (Groups F and G) are, on the whole, more completely developed than the larger. A field investigation in Lancashire, probably the least developed single area in the country, indicated that low standards of public service generally, a tendency to concentrate on more accessible industrial load, and the enormous strength of municipal vested interests were the main checks on progress.

Inconclusive as this discussion must be, it is clear that the full benefits of rationalization cannot be attained until the "spotty" development, only partially revealed in the average figures of column (g), Table III, is corrected. Efficient load building by authorized undertakers is a matter, broadly, of proper rate design, commercial mindedness, and economically balanced areas of supply. Each of these will be considered briefly.

Rate design, by undertakers ignoring the experience of others and cost analysis in their own areas, has tended to be haphazard. In some places, e. g., Liverpool, Wimbledon, West Ham, special studies have been made of the cost of certain types of service; but, in the 43 undertakings studied, only two (the North Eastern Electric Supply Co. and the Hull Corporation) were conducting a thorough analysis of costs and diversity as a basis for class rates. Attempts to get concerted action toward uniformity have been largely abortive. In 1926 a committee appointed by the Electricity Commissioners recommended a two-part tariff for promotional use but could agree on no type of multi-part tariff "sufficiently perfect . . . for exclusive adoption."[94] A similar committee in 1929 was more positive in its plea for a two-part tariff based on the area principle which it would have empowered the Minister of Transport, on application, to *order* undertakings to offer as an alternative to their statutory maximum flat rate.[95] But the Commissioners demurred at such a stand, not only because of the varying character of supply districts but also the widespread preference for the "rateable value" method.[96] As late as 1932 only 448, out of the 650 undertakings supplying consumers in Great Britain, used a two-part tariff. Some conception of the multiplicity of methods used may be gleaned from Table IV.

Aside from the merits of the rate-schedule used, which is beyond our present interest, such tariff confusion in a small area like Great Britain stultifies independent effort to build load and

[94] *Report of the Advisory Committee on Domestic Supplies of Electricity and Methods of Charge*, July, 1926, p. 16.

[95] *Report on Uniformity of Electricity Charges and Tariffs*, July, 1930, p. 24. Area was to be computed in square feet from outside measurements, multiplied by the number of floors, less certain allowances. The fixed charge was to be graduated according to appropriate ranges of square feet of area.

[96] Electricity Commissioners, *11th Annual Report*, p. 33. The "rateable value" method of determining the fixed charge (a fixed percentage of the value of property for taxing purposes) is widely used, especially by local authorities who have access to the basic data, despite its inequity over extensive areas. Consumers find it definite and "understandable". It is simple to calculate and may be arbitrarily weighted to conform to special economic conditions. In its defense, it should be remembered that rateable value is often roughly correlated with ability to pay and hence the method is often consistent with relative elasticity of demand.

TABLE IV. METHODS OF ASSESSING THE FIXED CHARGE IN TWO-PART DOMESTIC TARIFFS USED BY UNDERTAKINGS IN GREAT BRITAIN, 1932.*

Method of Assessing Fixed Charge	Number of Undertakings
1. 7% to 25% of rateable value†	125
2. Area of house	
Number of rooms	69
Measurements or size generally	81
3. Wattage of lamps	38
4. Sliding scale according to kw. hrs. used	11
5. Rental	1
6. Rate according to daylight hours	1
7. Water rate	1
8. Acreage—rural rate	1
9. Contract system	1
10. 1/10 of assessed rental	1
11. Unclassified	118
TOTAL	448

*Adapted from Miss Ismay Goldie, Research Assistant to Chief Statistician of C. E. B., "Towards the New Housing", 74 *Architectural Review* 196 (November, 1933).

†The rateable value method gives results that vary with the basis of assessment as well as the percentage used.

sterilizes any cooperative advertising on a national or even a district basis. In one part of Central England three farms within a mile radius are served by three separate undertakings, each using a different *method* of charge. Under the most ideal circumstances it is hard to make consumers understand rate-schedules for electricity; under such conditions, it is impossible. Inevitably, good will is lost and utilization remains incomplete.

Commercial mindedness is a rare quality among British electricity undertakers. Services offered (hire and hire-purchase of wiring installations, appliances, and apparatus) and promotional work (showrooms, canvassing, advertising) vary in quantity and quality between undertakings even more than rate-schedules. In 1929, out of 614 undertakers giving supplies, 230 had incurred expenditure neither on wiring nor appliances and only 187 had risked investment in both. Of the total invested in such promotional work, 77 local authorities in areas of 50,000 population or more accounted for 64.2%.[97] There is no uniformity in policy. Some provide such services at cost as an aid to load building; others nullify low energy rates by exorbitant charges for wiring and apparatus. Where equipment and pricing are proper, promotional effect is often negligible because of lack of advertising, canvassing, and desirable showrooms. This is typical of local authorities which own both gas and electricity undertakings. Out of 13 such municipalities studied, including some of the largest in Great Britain, I found only four (Glasgow, Leeds, Rochdale, and Hull Corporations) where electrical development was unhampered by other municipal interests; and the case is not definitive for either Glasgow or Leeds. Municipal councils, especially since the legislation of 1926, are doing their best to protect investment in gas equipment and plant. A common complaint among managers was that the gas department was permitted to offer facilities and expend money upon development which was denied them; and many frankly admitted that proper progress in their areas was impossible while management was dominated by the city council. The importance of this question to the ultimate success of the grid is suggested by the fact that there are 138 such local authorities in Britain today.

Economically balanced distribution areas remain the great unsolved problem in the British electric supply industry. Average figures mean little when areas vary from one or two square miles to over 5,000, and consumers from under 100 to over 120,000. But in the last year for which figures are available (1931-32) the average number of consumers for local authorities was 8,876

[97] *Report on Assisted Wiring and Hiring and Hire-Purchase of Electrical Apparatus*, 1930, pp. 5-6.

and for companies 4,225.[98] Lack of data prevents a similar comparison of areas served, but a list of undertakings and an atlas will convince the most skeptical that the dense centers of potential electrical development are, for the most part, controlled by municipalities. In any system there will be unprogressive undertakings which are unwilling to risk present high earnings through extensions unprofitable in the short run. But in a system in which choice areas are dominated by restrictive political control and large areas robbed of their key load centers by impotent local distributors, progress demands reorganization.

No positive action has yet been taken to solve these problems of load development. With the exception of one small supply in Scotland, the Board has made no attempt to control tariffs to ultimate consumers, or the efforts devoted to commercial development. It has sought the voluntary cooperation of the industry and has relied upon the successful operation of the grid to win that support. In the furtherance of this policy it has held aloof from publicity and confined its efforts to the support and reorganization of the British Electrical Development Association (E.D.A.).[99] It would be unfair to gauge the future competence of this organization by its uninspiring history, but its dependence upon voluntary cooperation, the pitiful record of which has been touched upon in this paper, does not promote confidence. Moreover, the sporadic development indicated in the last few paragraphs makes dubious the success of an organization devoted to national advertising and the voluntary coordination of developmental activities within the industry.

One obvious way out of these difficulties would be to set up another public corporation or series of district corporations, similar to the C.E.B., which would do for distribution what the Board has done for generation and transmission. A regional distribution authority would make possible uniform types of tariffs, standard terms for hire and hire-purchase, commercial effort proportioned to load potentials, economically balanced distribution areas, and the removal of the stifling political control of municipal gas departments—advantages much to be desired. Possibly more important, regional centralization of rate policy would provide much greater flexibility in the quotation of rates to industrial consumers because of the greater diversity of demand in a more economically balanced distribution area. This is the basis of the claim of several of the Board's district managers that, with control of distribution, they could make any number of advantageous special agreements at prices lower than grid tariff. Because of load characteristics, these would benefit the Board, industry generally, and all consumers on the grid. But in view of the mutual distrust of local authorities and companies, it is almost inconceivable that a regional distribution authority could be formed without the equivalent of nationalization. This would mean the failure of the distinctive feature of the British plan, the existing balance between public and private ownership, and consequently it does not qualify as a solution.

[98] Electricity Commissioners: *Electricity Supply*, 1931-32, pp. v & xv.

[99] In consideration of a contribution of £50,000 per annum, E. D. A. has been purged of representation of all interests other than the electric utilities themselves. The Board will exercise no direct control. An interesting by-product of the *Memorandum on Distribution in Urban Centres* (Nov. 17, 1933) was the fact that out of the 16 members of the Council of E. D. A., only three of the 23 undertakings rated most efficient in Great Britain were represented.

Barring such an alternative, four weaknesses in the present plan require correction. (1) No provision has been made to control the incidence of savings achieved for the undertakers by the grid. Direct regulation of electricity rates to consumers is considered inconsistent with the cherished individualism of the British entrepreneur. But rationalization itself is evidence of the failure of individual action; and the widest utilization of electrical energy requires public supervision. The jurisdiction of the Electricity Commissioners, limited to the maximum charge at three-year intervals on appeal, is inadequate.[100] If realized economies are to be passed on to consumers in lower charges or more complete service, the *power of initiative* in rate inquiries and the power to fix specific rates must be lodged in some public body, either the Electricity Commissioners or the Minister of Transport.[101]

(2) The present law requires so much cumbersome negotiation and administration for special supplies that it impedes electrification. Moreover, it encourages the unprogressive undertaker to sit idle and accept the benefits of the Board's pioneering. Were the Board able to serve direct, undertakers would be forced to rouse themselves from their monopolistic lethargy and actively canvass potential customers. Desirable as such legislation is, I do not anticipate that vested interests can be so closely shorn, short of nationalization. There is one exception to this. The Southern Railway experiment has shown that, whenever extensive main line electrification of railways becomes a practical issue, the political and administrative red tape required by the 1926 Act must be cut. At that time a bill providing for direct supplies to railways may be expected.[102]

(3) If voluntary cooperation is a dubious remedy for the shortcomings of rate design and commercial practice, it is even more incredible that it should bring economic balance out of the existing chaos of distribution areas. The right of local authorities to purchase distribution systems within their political limits at recurring intervals must be abrogated and provisions legalized to facilitate the absorption of weak, unprogressive undertakings by the strong and active, whether they be municipal or private. Otherwise, economies of rationalization may be dissipated in costly, irrational distribution.

(4) The vital weakness of the C.E.B. from the commercial point of view is its Olympian aloofness toward the press and public opinion. Throughout 1932 only two official statements were issued by the Board relative to the progress of the grid. This negative attitude has limited the effectiveness of such unofficial publicity as the Economic Section of the C.E.B. has been able to initiate. This policy was apparently

[100] Such rates ordinarily have little regulative effect although in several instances the Commissioners have fixed specific prices under the guise of maximum tariffs. Sliding-scale prices have been unworkable for years. Many of the power company acts included provisions permitting the Board of Trade and, after 1919, the Minister of Transport, to revise the standard price from time to time but these provisions have been so long disused that the companies have obtained a vested right in their disuse. The power to fix maximum prices at three-year intervals on application applies to authorized undertakers, not to power companies. (Interview with Sir John Brook, Secretary of the Electricity Commissioners, August 8, 1933.)

[101] Although the theoretical problem would be unaffected, the factual problem would be greatly simplified in comparison with American regulatory practice because the plan will eventually make the actual cost of energy at the point of bulk delivery (practically a no-profit cost) a matter of public record for each undertaker.

[102] Such a bill has been recently introduced into the House of Lords (Electricity (Supply) (H. L.) 24 Geo. 5, 1934).

dictated during the construction period when nothing existed more substantial than plans, much capital was yet to be raised, and it would have been impolitic to risk antagonism. The result has been a lamentable and widespread misunderstanding of the economic significance of the grid and the relation of the C.E.B. to the supply industry and the ultimate consumer. This misapprehension extends to the managers of the smaller undertakings as well as to laymen. It has enabled unprogressive undertakers to blame the Board for anything from an interruption of service to a failure in tariff reductions. Backward and recalcitrant utilities cannot be brought into line without antagonizing someone. The engineering period *per se* is over; and the undertaker who impedes the commercial operation of the grid burdens both other undertakings within his district and his own customers as well. Public opinion is an effective cure for such obfuscation. The threat of a regional distribution authority may stimulate some self-correction, but the discouraging history of voluntary cooperation among electricity supply undertakings convinces me that active, official publicity by the Board is needed if the British plan is to be preserved and nationalization averted.

IV. Conclusion.

It would be incorrect to place responsibility for the situation detailed in the preceding pages upon either the C.E.B. or the Electricity Commissioners, but it would be superficial not to recognize that both of these bodies have been absorbed with engineering functions to the neglect of economic considerations. As a planning body, the Electricity Commissioners have failed to appreciate the need of a thorough economic analysis of each district as a guide for regulatory policy. This blindness to the economic side of their problem has meant that powers, official and non-official, which could have been invoked to correct weaknesses in the industry were not used. For example, the Commissioners are a court of last resort for approving areas of supply. They could have withheld approval on the ground that the proposed area was economically unbalanced and consequently forced the extension of existing areas or an amalgamation of areas. Instead, they have followed the path of least resistance with the result that a large proportion of small undertakings have been created since 1919.[103] Powers over capitalization of companies, borrowing by local authorities, extensions of generating plant,[104] and the determining of maximum tariffs, permit a degree of unofficial pressure upon undertakings practically unexploited by the Electricity Commissioners.

The C.E.B., although it did set up an Economic Section, has refrained from any extensive use of this department which should constitute the nerve-center of the organization. In fact, with the possible exception of the Supply Department, the Section is not used by other departments of the C.E.B. Its main work is unofficial, largely concerned with the problems of publicity. In 1933 it completed an economic survey of Central Scotland which has been followed by comprehensive surveys of North West England and South East England (now in process). These in-

[103] Interview with Sir John Brook, Secretary of the Electricity Commissioners, August 8, 1933. At that time conferences were being held with leaders in the supply industry with the object of achieving more economical distribution areas.

[104] This was absolute until modified by the Electricity (Supply) Act, 1922, § 13. Thereafter, extensions might be refused only if a substitute source of power, at a cost less than independent operation after the extension, was made available.

corporate investigations into the conditions and changes taking place in industry, agriculture, and population balance, and show the major trends which affect the growth and distribution of power consumption. In addition, it made an analysis of private plant in Great Britain which covers approximately 90% of all private generating plant installed. This compilation, placed at the disposal of the district managers, is kept continually up-to-date. Such inquiries provide the essential background for intelligent policy. They should have preceded the determination of scheme areas, let alone their operation. Even at this date they may be valuable, but it remains to be seen how effectively the C.E.B. will employ them.

Rationalization in any industry necessitates some realignment of public and private rights in control, ownership, or both. Difficulties presented by such readjustment in the British electricity supply industry have been indicated in this discussion. Even in a country such as Great Britain, the compromises with vested interests written into the legislation of 1926 have been shown to constitute such obstacles to efficient operation that they imperil the ultimate success of the grid. Burdened with constitutional provisions interpreted so as to give maximum protection to private property, faced with a high degree of interconnection brought about by holding companies which may have absorbed attendant economies, to apply a similar scheme in this country might cost more than it is worth. But for the wider problem of economic planning, social control within a capitalistic organization, the British experiment will repay close attention.

A Critique of Land Tenure Research

By M. M. KELSO

AFTER the Civil War, the Homestead Act and the opening of the prairies caused a great increase in the number of farmers as well as in the land in farms. Between 1870 and 1880 about 1,340,000 new farms were created, an increase of over 50%, and 128 million acres of land were added to our farm empire. In the next 20 years, 1,737,000 new farms were added on the frontiers of the West and North. The slogan seemed to be literally true that Uncle Sam had a farm for everyone, and that every farmer could be the owner of a piece of land without paying tribute to a landlord. No wonder the nation was surprised and startled when the 1880 *Census*, the first to give any information on farm tenure, showed that 25.6% of the farms of the nation were operated by tenants. This percentage was increased to 28.4% by 1890. Although over a million new farms were created during the last decade of the 19th century, most of them on the frontiers by freeholders, the apparent number of tenant farmers had increased even faster, enough to bring the proportion of tenants to 35.3% by 1900. However, previous to 1900, the collection of tenure statistics was not comparable in method to that in 1900 and following, so that the apparent increase of 6.9 percentage points (28.4% to 35.3%) from 1890 to 1900 must be accepted with reservations. Apparently, the real increase during that decade was proportionally no greater than at any time afterward up to 1925.[1]

[1] This is discussed by L. G. Power, "Farms Classified by Tenure", 12th *Census of the United States*, Vol. V, pp. LXVI-LXXXV.

Rapid Increase in Tenant Farming Likely to Continue

Although the first quarter of the present century brought an increase of only 3.3 (35.3% to 38.6%) in the percentage of all farms operated by tenants, the five years following 1925 added another 3.8%, bringing the 1930 percentage to 42.4. The apparent cause of this movement is evident. During the five-year period following the collection of the 1925 *Census of Agriculture*, the post-war burden of farm mortgage indebtedness in conjunction with the sharp drop in agricultural incomes coincident with the depression precipitated a heavy wave of foreclosures and voluntary reversions of encumbered farms, the farms either being left in the hands of the previous mortgagor now operating it as tenant, or being put in the hands of a new tenant. Over those five years, whatever the cause, the increase in tenancy was more rapid than over the entire 25 years preceding.

Nor is there any apparent reason for believing that the proportion ceased to increase after the 1930 *Census* was taken. The crisis did not become severe until after 1930, the growing tide of foreclosures finally precipitating the militant agrarian demonstrations of 1932 and 1933 which resulted in much emergency legislation in the middle western states for the purpose of easing the pressure upon distressed debtors. But will this moratorium on foreclosures continue? Holders of farm mortgages are now either cowed into leniency or are being lenient because it is more to their financial interests to have oper-

ators on their farms paying taxes rather than themselves shouldering the burden of operation in these trying times or than letting their properties lie idle. However, it may be that, as agricultural conditions improve, foreclosures will again mount because of the scramble of mortgage creditors to liquidate, and the result will be a growing proportion of tenancy.

It seems likely that following the chastening period of this depression, two other factors may assert themselves to increase the percentage of tenancy: (1) Optimistic placing of farm mortgage loans may not be so prevalent in the immediate future as it has been at times in the past. "Shoe-string" loans based upon values largely speculative plus a lack of supervision by the mortgagee over the mortgagor's handling of the farm given as security for the debt may not be so prevalent as they have been at previous times. In other words, both borrowers and lenders may shy away from loans on a high percentage of the value of the property made with the optimistic belief that increasing property values will lower the indebtedness to a "safe" ratio. Consequently, buyers will be less numerous because of the necessity for a larger down payment, and as a result a higher proportion of the farms will be operated by tenants. (2) The attitude of the people as to the desirability of land ownership may change. Many people are likely to come through this period with the conviction that owning such a fixed form of investment as land is not practical for the man of small means; that it is better for him to rent and put his limited resources in more liquid capital such as equipment and live stock, leaving the landlord to hold the bag of "frozen assets" in times of depression. If, in conjunction with this changed attitude toward ownership, the opinion of the farmer class is that employment opportunities or opportunities for small businesses in cities are restricted, then they may choose to remain on the farms as tenants rather than as owners.

In summary, it appears that tenancy in America is likely to continue the rapid increase which set in between 1925 and 1930 because (1) there has been and may again be an increased amount of foreclosure of farm mortgages and reversion of distressed farms to mortgage holders who, in many cases, are in no position to operate their farms themselves, but who, wishing them operated, turn them over to tenants; (2) the decreased optimism concerning the rising level of land values and the safety of debt when secured by land will likely tend to make down payments larger and purchase slower because of the necessity for larger proportionate accumulations; (3) the belief that land is highly desirable as an investment because it cannot burn up, blow away, or be stolen may be replaced by the conception that its *value* may disappear—a contingency to be as greatly feared as though it were to burn, blow away, or be stolen—thus impressing upon farmers of moderate means the desirability of working toward "income" and "living" rather than carrying the added risks of "ownership".

What has been said so far refers particularly to that part of the United States where ownership of land is the ultimate aim of practically every tenant. For this reason the value of land, the problems of credit and foreclosure, and the risk of falling land values are important to the prospective owner. In other parts of the country, the number of tenants is influenced by many other factors. For instance, it is reported that many southern landlords are re-

ducing their acreage of cotton by discharging tenants who have little opportunity at either urban or farm labor. If this be true, the 1935 *Census* may report from 100,000 to 600,000 fewer southern tenants than the 1930 *Census*.

But these hazarded forecasts are mere speculation made from a priori assumptions and commonly accepted facts. Actually, many other and different things may happen depending upon the reactions of buyers and sellers of land to the maze of forces around them as well as upon the activity which society may manifest through anti-foreclosure demonstrations and legislation of one sort or another. The very hesitancy with which these hazarded forecasts are made and the admission that many other things may happen to alter the future course of events here portrayed emphasize our lack of understanding as to the processes of society as expressed through social groups.

Forces Determining the Land Tenure Pattern

Farm tenancy is looked upon with varying emotions by different people. Some would destroy it root and branch, feeling that it is all evil[2]. Others, though conscious of its many shortcomings, feel that the renting of land has a place in the American tenure pattern. They would prefer to remedy its defects. But whatever our objectives may be, or if we are merely interested observers, it is important that we have full knowledge of causes and trends if we are to predict changes or have a hand in altering the factors of the socio-economic environment in order to secure a more desirable tenure system. If our objective is to decrease tenancy in the Corn Belt or to raise the standard of living of the cropper or to aid mortgaged owners through their trying period of debt, we must understand the content and interaction of forces which produce these phenomena so that we may know where to introduce changes in the tenure pattern. Richard Jones saw this when he wrote in 1831:

> "The actual prevalence of metayer rents, therefore their modifications, their gradual progress in some cases toward different forms of holding, in others, the sturdy resistance the system offers to the assaults of time and even to the wishes and efforts of those who would willingly rid themselves of it; these are all circumstances to be studied carefully by those who would discern the causes of the actual state of some of the most interesting countries in Europe, or speculate upon the progress of future changes either in their political and social institutions, or in their relative strength and power as nations."[3]

With these thoughts in mind, the following qualitative analysis of the forces which produce the land tenure situation is presented. What are the forces at work and how do they interact in producing this pattern?

First of all it is necessary to have a clear conception of the nature of the pattern itself. In the final analysis, land tenure is a problem in *human behavior*. Land tenure is the result of human wills interacting, competing, and cooperating with respect to their control over landed property and its derivative—control over each other's activity. As a result of these interactions, certain groups evolve, each with its own tenure status. The discovery and recognition of these various groups have been a gradual process. The earlier federal censuses enumerated only owners and tenants, the latter being subdivided into "share" and "cash" tenants. In 1900 part-owners (i. e., owners renting land in addition to their own farms) and managers

[2] See for instance, "Don't Rescue Tenancy: Abolish It", by J. M. and E. W. S. Maclachlan in the *New Republic*, June 13, 1934.

[3] *Peasant Rents* (Economic Classics Edition). New York, 1895, p. 95.

were recognized as separate tenure groups. Farm laborers were enumerated in the population schedule. Subclassification by "cropper", "standing renter", by nativity, race, sex, and age came still later.[4] These general groups were redivided by students studying the "agricultural ladder", until the letters "F", "T", "O", "L", etc., and their combinations became as intricate as the "alphabet soup" of the present recovery program.[5]

Tenure Groups Are Not Sharply Defined

We are inclined to think of these tenure groups as being sharply defined classes, based upon legal distinctions as to the rights the individual possesses over property. Thus, the owner in fee simple has full rights over his land. The tenant has acquired certain rights from a landlord for a definite period of time, although the owner has reserved a large number of rights for himself. The laborer has few or no rights in land as such. In reality, men cannot be classified into a few distinct groups, for within each group such a variation of behavior obtains as to keep any dividing line based on legal distinctions from truly reflecting human behavior. Within the owner group are the true owners, full and unencumbered, but there are also mortgaged owners whose behavior in regard to land may be but little different from the behavior of cash tenants. The behavior of cash tenants may be more distinct from that of owners than is the behavior of those tenants who are called "owners in prospect."[6] Within the so-called tenant group is a long array of types each distinct in behavior from the others, an array extending all the way from that group resembling owners—"owners in prospect"—to that shaded dividing line between tenants and laborers where we find the "cropper." Further, although we are wont to think of the tenure problem as one of "owners" and "tenants", it is in fact much broader than that. A relationship also exists between each of the members of these two groups and the members of society and its representatives in government. The man-man relationship pervades everywhere; in so far as any individual is interested in the use and control of land, he is involved in a web of land tenure relationships with every one else in the society.

Therefore, our dependent variable must be more exact than in terms of "owners", "tenants", and their various sub-groups. To sub-classify the groups into unencumbered and mortgaged owners, cash and share tenants, croppers, etc., makes the variable more explicit, but not yet completely specific. Such being the case, accuracy of analysis would be achieved by classifying the individuals directly upon a basis of the characteristics in their behavior which distinguish the tenure groups one from another.

Freedom of Management as a Basis for Classification

From the standpoint of human behavior, in so far as the activities of the related parties in a land tenure nexus are concerned with control over the activities of one another through con-

[4] See "Federal Census Data on Farm Tenure" by M. M. Kelso in Social Science Research Council Bulletin 20, *Research in Agricultural Land Tenure, Scope and Method.*

[5] See such articles as E. D. Tetreau, "The 'Agricultural Ladder' in the Careers of 610 Ohio Farmers", 7 *Journal of Land & Public Utility Economics* 237-48 (August, 1931) and Carl F. Wehrwein, "The 'Agricultural Ladder' in a High Tenancy Region", *Ibid.* 67-77 (February, 1931).

[6] This term was coined by Dr. Tetreau (see footnote 5). It means those tenants who are renting farms from a father or father-in-law and who have definite agreements with their landlords that the farms they are operating will become theirs by gift or inheritance.

trol over land, their activities are circumscribed by rights, duties, liberties, and exposures which determine the tenure status of each—which *are* the tenure status of each. Each party possesses through his relationship to landed property certain rights of action, certain things he *can* do to another if he so desires, and also certain duties to all other parties, certain things he *cannot* do because they will infringe upon the rights of others. And beyond this can-cannot relationship lies the realm of "liberties and exposures". Each party to the man-man relationship and through his relationship to landed property possesses an area of activity within which he is uncontrolled by the institutions of society and wherein he is at *liberty* to do as he pleases with his powers of property subject only to his *exposure* to the liberties of all other parties to do as they please with their powers.

Instead of classifying the persons who make up the tenure pattern on a basis of their relation to land—a legal concept—a better basis for classification would seem to be the degree of freedom of management which the individual possesses—a basis of man's relation to man. Freedom of managerial expression varies all the way from an almost complete lack of it on the part of the farm laborer to almost complete enjoyment of it on the part of the unencumbered owner. The distinction between the "cropper" and "third and fourth" tenant is not only based upon the difference in the amount of property owned, their legal status in the courts, but also the degree of supervision the landlord exercises over each or, conversely, the lack of freedom of each to manage his farm as he sees fit. This freedom of management, however, is never absolute. Even the full owner is subject to restrictions imposed by society and society has not complete or arbitrary freedom of control over the individual's property because of the limitations placed on it by institutions of custom.

A tenure differentiation of individuals identical to that obtained on the basis of managerial freedom may be accomplished by two other criteria which are, in fact, but two other aspects of managerial freedom viewed from the standpoint of "economic return" or of "functions" performed in society. In the light of functions performed, the greater the freedom of management, the greater is the risk borne. The full owner bears practically all the risks coincident to control over property—his liberties and exposures are great; the tenant may share almost equally his risks with his landlord, whereas the laborer bears the fewest risks of all. In terms of economic return, the greater the freedom of management with its correlative of greater risks, the greater becomes the opportunity for profits and losses—the greater the field of liberties and exposures. Thus a bountiful harvest with high prices means little to the farm laborer who has made a hard and fast contract with a farmer; he gets his wages and no more. The cropper who receives half of the crop stands to gain or lose more than the laborer, and so on up the scale.

Research Should be Concerned with Forces

A survey of the research in land tenure in the United States up to 1933 shows a total of 58 studies, all of which are concerned not so much with the broad field of the tenure pattern as with the so-called "tenancy aspects". Twenty-six of these studies are primarily pictures of the tenancy situation in various regions of the country, particularly the "agricultural ladder".[7] Research of this type was necessary to obtain the data for the

[7] See footnote 4, *supra*.

later and more fundamental aspects of the study of the tenure pattern. However, mere description tended to show the tenure picture as a fixed, immobile phenomenon. A more realistic approach is one which conceives the pattern as a moving phenomenon of social relationships in which human beings are constantly adjusting themselves not only to changes in their "outer", "objective" environment, but also to their "inner", "subjective" environment of attitudes and beliefs, changes which are the result of the interaction of these environments in a dynamic changing world.

A land tenure theory conceived as a moving phenomenon of social relationships should attempt to explain the causes for the evolution of agrarians from serfs through successive stages of peasantry as they gradually attain greater liberty of person, becoming ultimately in England "capitalist" farmers, and in other places, owners. It should point out the causes for the immediate appearance in colonial America of fee-simple ownership among colonists from old-world countries in which feudalism was still the pattern of thought, although as an institutional organization it may have been badly decayed; it should show why the evolution in tenure patterns was gradual in England, and sudden in France; why the tenure pattern is different along the St. Lawrence in the region of Montreal than elsewhere in America; why tenancy has been unimportant in New England, but has grown elsewhere; why the tenure patterns in the South have been so different from those elsewhere in America, and the reasons for the change from laborers to cropper tenants on the part of the negroes; and the cause of changing patterns of tenure on the western American ranges.

Research of this type will go beyond mere description to analysis of cause and effect relationships and will try to discover the *forces* which cause variations in human behavior. Of the 58 studies mentioned above, 32 discussed relationships. However, but few of them were primarily concerned with cause and effect, such as the effects of certain factors on the tenure pattern, or the effects of the tenure system (especially "tenancy") on the fertility of the soil, farm management practices, stability of the rural community, standard of living, and other subjects.

Therefore, we still may ask, why do some individuals or groups have greater freedom of self-expression than others? Why do some strive to increase that liberty while others are content with their lot? What forces cause whole groups to increase their desires for freedom at one time and to decrease those desires at a later period?

Answers to such queries appear far more important in shaping institutions of land tenure than does a classification, enumeration, or description of tenure groups. When land tenures are regarded as changing social relationships, it becomes significant to examine both the concrete changes in environment which confront those who are actively part of the land tenure system and also the individual attitudes which condition responses to these environmental changes. For convenience, these two kinds of factors can be designated the external, objective and the internal or subjective factors. Both have a place in analyzing institutions of land tenure.

To one familiar with agricultural tenancy research, four objective factors stand out as the most important: they are (1) farm values, (2) capitalization rate for land incomes or the percentage of the land value composed of speculative or amenity values, (3) ease of ob-

taining mortgage credit, and (4) the type of farming that is practiced.[8]

The level of farm values is related to the tenure pattern not because high priced lands are more difficult to purchase out of land income (if the capitalization rate is not too high), but because purchase on mortgage with the necessity of a down payment which is larger for high priced farms than for low priced ones causes the buyer to spend a longer period of time in other occupations or in a lower tenure status in order to earn the required down payment.

The magnitude of the capitalization rate by which land incomes are converted into land values is of primary importance in determining the tenure pattern. When the rate is low, land values are relatively high, and the income from the land will not be sufficient alone to pay the mortgage interest, making necessary payment for the land from other income, such as wages or profits or interest from other investments. When the capitalization rate is low, people are discouraged from buying (other things remaining equal, a qualification to be discussed later), and the tenure pattern shifts in the direction of a larger proportion of tenants.

The ease with which mortgage credit may be obtained operates in two ways to influence the tenure situation. First, the rate of interest, when high relative to the rate charged on loans elsewhere, may have a deterring effect upon purchase of farms through its possible dampening effect upon the desires of those seeking purchase of farms on mortgage. Second, the optimism and confidence which borrowers and lenders have as to the safety of land as a security for debt, an optimism related to their confidence in the future of agriculture as an industry, when firm will be followed by easy mortgage credit; the percentage of the value asked as down payment will be small, and ownership will be encouraged. The converse will be true when that confidence is shaken as it is at present.

The type of farming practiced in a locality affects the tenure pattern in two possible ways. First, some farming types are not adapted to tenant operation because (a) they require long-time planning and comparatively fixed investment (such as fruit orchards); or (b) they require much special or easily damaged equipment (such as dairying); or (c) the product is difficult to share equitably because of variations in the proportionate share of the expenses borne by each party (such as dairying, truck farming). Second, the managerial burden in some lines of agricultural endeavor may be such that men can enter it quickly as owners from the farm-boy stage because it does not take them long to become proficient operators, while in other lines a long apprenticeship must be served to learn the management, thus slowing up the rise to freedom of operation through the introduction of the laborer stages.[9]

Other external factors not so easily reduced to mathematical terms which

[8] F. A. Goldenweiser and Leon E. Truesdell, "Farm Tenancy in the United States", *Census Monograph* IV, 1924.

[9] " . . . in those towns where [agricultural] specialties of relatively easy entry predominate, such as poultry farming or vegetable growing . . . the farm boy-to-owner route [up the agricultural ladder] is most prevalent. In towns characterized by specialties of more difficult entry, such as tobacco growing or dairying, the farmboy-to-farmhand-to-owner route is the most frequent route . . . There is a fairly noticeable tendency for the longer routes of vocational climbing to be associated with such types of farming as dairying and tobacco growing, and for the shorter routes of vocational climbing to be associated with poultry production and vegetable growing." (Hypes, J. L. and Markey, J. A., "Genesis to Farming Occupations in Connecticut", Storrs Agricultural Experiment Station, *Bulletin* 161, October, 1929.)

exert an influence on the tenure pattern are the alternative opportunities for endeavor in other lines than agriculture or in agriculture in other regions, such as the possibility of obtaining free land, and systems of leasing and legal arrangements, such as statutes forbidding land ownership and regulating the leasing of agricultural land by Orientals.

Some of these factors are often correlated with the percentage of tenancy. Census data can be used to show that direct correlation obtains between high land values and a high proportion of tenant operated farms. However, this gives no clue to which is cause and which is effect. It is generally assumed that high land values are the cause of a high percentage of tenancy. On the other hand, it may also be assumed that, where tenants are numerous, the intense competition for land in the rental market causes landowners to bid up the price of land in order to be able to draw high rents. A third assumption is that both are the result of other causes. This assumption apparently has some validity because in certain sections of the United States no relationship exists between the proportion of rented farms and any one or a combination of the four factors.

As between the counties of southern and of eastern Wisconsin, the difference is slight in land values, rate of capitalization of land income, mortgage interest rates, and types of farming. Yet in southern Wisconsin proportions of tenancy approaching 40% are found in certain localities, while Kewaunee County on the western shore of Lake Michigan has but 3% of tenants. To explain the difference one must turn to subjective factors, to attitudes toward land ownership and tenancy as they grow out of cultural backgrounds, community solidarity, and stability. "Social conduct of individuals cannot be explained by recourse to a study of the external environment alone, or by attention to the observable overt reaction of the person."[10]

The Subjective Factors of the Land Tenure Pattern

Correlating and even establishing cause and effect relationships between the proportion of tenant farming and these external factors are, therefore, not enough. To do only this is to make the study mechanistic, in the sense that the influence of human personality upon the tenure pattern is ignored and cause and effect are conceived as an impersonal mechanical process. But social relationships cannot be forced into a mechanistic mold. Human beings and their varying responses to their environment cannot be waved aside. Hence, the next step in the analysis is to determine those factors of human personality which modify the human activity aroused by objective factors of the environment; to find the subjective factors which modify or strengthen the effects of the objective forces.

Complete analysis of the causes of land tenure patterns must include the mental images, attitudes, ideals toward land tenure as of equal importance with the objective, real phenomena of the external environments.

" . . . while the effect of a physical phenomenon depends exclusively on the objective nature of this phenomenon, and can be calculated on the ground of the latter's empirical content, the effect of a social phenomenon depends in addition on the subjective standpoint taken by the individual or the group toward this phenomenon, and can be calculated only if we know, not only the objective content of the assumed cause, *but also the meaning which it has at the given moment for the given conscious beings* . . . a social cause cannot be simple, like a physical

[10] Kimball Young, *Social Psychology* (New York: F. S. Crofts & Company, 1930), p. 143.

cause, but is compound, and must include both an objective and a subjective element, a value and an attitude."[11]

These considerations have more than an academic interest. If the tenure pattern were always associated with certain external factors, then it would be within the power of society to change the system by merely changing these factors. For instance, the Farm Credit Administration could be used to establish the rate of farm mortgage interest with the deliberate intent of changing the tenure pattern. This might be accomplished in some localities, but in others it might fail completely because subjective factors were neglected.

For instance, it is proposed to abolish tenancy in the South by setting up compact agricultural communities on the subsistence homesteads plan on a scale large enough to include several hundred thousand people. The plan contemplates both negro and white communities which would own the land in partnership with the Federal Government. Individuals would hold their land on lease from the association. The project includes home craft projects, such as mills for grinding grain, processing of foodstuffs, etc., operated by these associations.

Everyone interested in improving the condition of tenants in the South will be in hearty sympathy with the intent and purposes of the plan. But will it succeed? Will a mere change in the external tenure pattern be sufficient when the project calls for revolutionary changes in customs, ideals, and attitudes of these people? For generations they have been under the supervison of landlords, and have had no experience with freedom of management and with the risks and responsibilities of ownership. In fact, many of the roving tenants have never developed a desire for ownership or even for the higher forms of tenancy. Their high mobility has made them individualists unused to community and cooperative efforts. Yet the plan calls for self-directing communities which will simultaneously act as landowners, landlords leasing land to members, and engage in manufacturing. They are expected to amortize the original cost of the land and equipment. Granting that "people are never innately ignorant, innately malnourished, innately inefficient or unmotivated", a question still persists as to whether it is wise to establish such communities without patient and long-continued education, guidance, supervision, and limitation upon rights over their property. These are not enumerated among the "necessary conditions" presented by the authors, although mentioned as part of the University of Georgia's program in connection with its subsistence homesteads project. Even this program does not include all the provisions mentioned.[12]

Of interest to us for solving the land tenure problem are the attitudes exhibited by the operators of farms toward the various tenure forms and toward the various external factors previously mentioned. In addition, there are the attitudes of the owners of land toward the same factors. The intensity of the desire for freedom of management, the attitude toward the desirability of owning a farm or toward the desirability of attaining a higher rung on the tenure "ladder" will determine the kind of activity exhibited by people in the face of farm values, capitalization rates of land income, mortgage problems, etc. Also, the attitudes of owners of land toward the desirability of holding that

[11] Thomas, W. I. and Znaniecki, Florian, *The Polish Peasant in Europe and America.* (Chicago: R. G. Badger, 1918), Methodological Note, p. 38.

[12] J. M. and E. W. S. Maclachlan, *op. cit.*

land and toward the future of agriculture will determine their reactions in the face of these same objective factors. It is apparent that what is needed is an analysis of the way by which the reactions of men to external forces alter the supply and demand situation with regard to farm land. As the intensity of the urge for freedom of self-expression grows, the demand for farm purchase is increased relative to the number of farms in existence, and the tenure pattern shifts toward freedom in operation —toward ownership; as confidence in the future of agricultural values falls, mortgage credit becomes more difficult to obtain, and owner-operation is retarded because of the necessity of larger down payments. The intensity of the desire for greater freedom in management determines the level of living which the person will support within his income in order to obtain a surplus with which to purchase that greater freedom.

It would not be fair to say that the previous studies of land tenure have ignored the human factors and the attitudes and ideals of the members of the various groups; rather they have usually classified the individuals involved on a basis of certain of their external characteristics, assuming that these external characteristics were correlated quite directly with the attitudes of the individuals toward the tenure complex. The following factors have been suggested as being useful in this connection: (1) nativity (as to whether foreign or native born) of white operators; (2) race (to distinguish negro, Oriental, and Indian from white operators); (3) age; (4) relationship to the preceding occupant; (5) amount of annual savings or surplus.[13]

[13] See Social Science Research Council Publication on *Research Method and Procedure in Land Tenure*, Project I.

Three of these five factors are introduced in an attempt to account for the variation in the desire for ownership as found among different individuals. (1) Nativity recognizes the difference which exists in the cultural heritage of the rural immigrant population as compared with that of the native white stock in this country, this difference usually evidencing itself as a greater "urge to ownership" on the part of these immigrant stocks. (2) Race is meant to portray the very familiar differences between our rural colored and our rural white stocks as to their desire for managerial freedom. (3) Classification on a basis of age recognizes that the behavior reactions of persons change as they advance in years; their experience tends to grow and their economic well-being in most cases improves. In conjunction with this, the cultural urge to ownership in many sections of America tends to drive these persons into ownership as rapidly as economic condition permits the advance, although in other sections such a cultural urge is not so powerful, and hence ownership does not increase so markedly with advancing years.

The fourth factor indicative of subjective differences—relationship of the operators to preceding occupants—represents an attempt to include in the analysis the influence of the institution or custom of inheritance upon behavior with respect to the tenure of land; it portrays the extent to which the succeeding generation has been habituated to remain "on the farm" or at home rather than to leave agricultural pursuits.

The fifth classifiable factor—amount of annual savings or surplus—is a reflection of varying customary levels of expenditure for living in relation to the earning ability of groups in various regions; custom may prevent adaptation

of production processes to conditions and thus cut down earnings or custom may demand a level of expenditures too high to permit savings and investment out of current income.

Classification on the basis of race, nativity, or age is logical for the purpose in hand only to the extent that these external characteristics of the individuals are correlated with the subjective attitudes toward tenure status. No doubt they are to an appreciable degree so correlated, but it is also evident that some variations in the attitudes of the individuals composing groups thus classified are ignored in the averaging process. If one continues increasing the specificity of the grouping in order to obtain classes homogeneous as to their attitudes toward tenure status, one would continue separating them on a basis of those attitudes directly until the distinction between native and foreign, black and white, young and old, would melt away into a distinction between attitudes toward ownership. Thus, carried through to its logical conclusion, grouping to obtain specific and clear-cut characteristics in the group would lead to classification by subjective, mental attitudes, and not by such objective considerations as nativity, color, or age.

Philosophically, mental attitudes determine the content and direction which human behavior set off by recognized stimuli will take. Ideally, when one's purpose is to determine the relative weight of the various attitudes and of the various objective phenomena in the formation of the land tenure pattern, the attitudes may be evaluated, laid alongside the evaluated, objective, stimuli, and correlated with the behavior they produce.

Unfortunately, attitudes cannot be studied as objective phenomena by looking within men's minds there to read the direction which response will take when subjected to certain external stimuli. The only way we have for determining what may be the attitudes of the individual's response system is through a study of the responses themselves to certain measured and controlled stimuli.[14]

Until we feel somewhat more sure of our ground as to the direct measurement of attitudes, we may resort to certain substitutes. The attitudes toward land tenure relationships are the results of experience, learning, habit-forming as they have been built upon the basic hereditary reaction mechanisms through contact with other people and life. Since these attitudes are the result of the social environment impinging upon innate reflexes, we may evaluate the elements from the social background and the hereditary constitution of the individuals, and correlate them with the behavior of the tenure group to which that individual belongs. The forces in the social background in order to be of significance in building up an individual's habit system must be perceptive to that individual, and hence to an investigator, if only he can recognize and locate them. These factors are found within the individual's cultural and family background, within the field of his experience. As long as direct classification by attitudes is difficult, indirect classification on a basis of cultural heritages, of customary modes of living, may be used to fill in the gaps, but only as a stop-gap substitute.

Summary

It may be advantageous to put in short, concise statements the thread of the foregoing discussion so that its logic

[14] Lundberg, G. A., *Social Research* (New York: Longmans Green, 1929); Young, Kimball, *Social Attitudes —A Symposium* (New York: Holt & Co., 1931).

may be more clearly apparent. First, the tenure pattern is to be interpreted in terms of freedom in management (or risks borne or profit possibilities available) as being indicative of the human behavior of which it is the result. Second, the variations in this human behavior, as it varies the tenure pattern, are to be explained by the use of subjective as well as objective factors. The objective factors—among them farm values, mortgage costs, land valuation rates, and types of farming—are interpreted by the persons of the area on the basis of their experiences, and their behavior with regard to these objective forces is directed by their attitudes as these attitudes have been formulated out of their experience and training. These attitudes are included in the study in the form of attitudes toward greater freedom of self in the control of the rights of property and in attitudes toward the future of agriculture as they influence one to remain in or to invest capital in the industry.

After the nature of the data to be included in the study are determined, the next and final step is to determine the manner in which it is to be integrated for purposes of the analysis. One way would be to correlate the variables, both objective and subjective, with the land tenure pattern interpreted as previously explained. But this would not give valid inferential material because either fact might be the cause of the other. The objective and subjective forces might cause the land tenure pattern to be what it is, but, vice versa, the nature of the land tenure pattern might have an effect upon the objective and subjective forces.

To overcome this difficulty the research method would study past changes in land tenure patterns, past changes in mental attitudes toward the tenure of land, past changes in the objective forces of farm values, speculative or amenity values in land, mortgage credit facilities, and types of farming. Data on these evolving forces should then be studied with an eye to obtaining the interacting effects of each in producing changes in the others. If, in this way, laws of change applying to any or all these forces are then derivable, we are in a fair way toward predicting future land tenure patterns and toward knowing where to direct reform efforts, if we are to obtain the desired effect. It is apparent that the method is analogous to that of time series in price analysis for purposes of price forecasting.

The concrete method to use in such a study is yet largely undeveloped. There are, however, two possible types of approach for developing the research structure.

The first method studies the entire society,[15] noting the place of the land tenure phenomenon within the general phenomena of the social life. This is, of course, the more realistic approach, for it is evident that the object of study "should be the actual civilized society in its full development, and with all its complexity of situations, for it is the control of the actual civilized society which is sought in most endeavors of rational practice."[16] But the second method, the method of our approach, is also satisfactory, if it be realized that further study of the social milieu may bring modifications into the principles derived from such partial analysis.

[15] Thomas and Znaniecki, *op. cit.*, p. 19.

[16] *Ibid.*, p. 17.

II. The Local Transportation Problem in the District of Columbia

By CHARLES F. MARSH

THE first instalment of this article which appeared in the last issue of the *Journal*[52] sketched the corporate, financial and operating, and regulatory background of the District's transportation problem as a basis for considering the various solutions of that problem.

The quest for adequate service, reasonable rates, fair profits, and relative freedom from wrangling and litigation has resulted in a host of suggested solutions of the transportation problem of the District of Columbia; some have been adopted and some abandoned. These remedial measures can be grouped under six general heads: (1) changes in the general rate level; (2) changes in rate structures; (3) improvement of service; (4) control of taxicabs; (5) unification of local transportation companies; and (6) government ownership. The first four of these solutions are considered in this article. The unification of the various companies and the possibilities of government ownership will receive separate treatment in an article to be published in a future issue of the *Journal*.

Changes in the General Rate Level

It is an economic truism that keen competition ordinarily results in a downward adjustment of prices. It is somewhat surprising, consequently, to find that the Washington transit companies, as well as local transportation agencies in other cities, have placed so much emphasis upon fare increases as a solution to their difficulties, a major cause of which has been the competition of motor vehicles. Attempts on the part of traction officials to secure higher fares and the efforts of various public representatives to prevent such increases and, if possible, bring about fare reductions have combined to keep fare changes in the forefront of discussions of possible remedies of Washington's transit troubles. The best approach to a study of the effectiveness of fare changes as a way out is to survey the actual history of such changes in the District.

History of Attempts to Change the General Rate Level. From 1894 to 1918 the standard fare was 5 cents or 6 tickets for 25 cents. Late in 1918 the straight 5-cent fare was established and the following June a charge of 2 cents was made for all transfers. On November 1, 1919, rates were increased to 7 cents, or 4 tokens for 25 cents, with a 2-cent charge for inter-company transfers. Rates went up again on May 1, 1920 to 8 cents, or 4 tickets for 30 cents, with the same transfer charge. A slight downward revision January 1, 1921, which cut the transfer charge to 1 cent, was followed by a further step in the same direction the following September when the ticket or token basis was changed to permit the sale of 5 tokens for 35 cents. A third and final downward revision providing for a fare of 8 cents, or 6 tokens for 40 cents, with 1 cent for inter-company transfers, became effective March 1, 1922.[53]

[52] 10 *Journal of Land & Public Utility Economics* 275-290 (August, 1934). Footnotes are numbered consecutively with those in the first instalment.

[53] A summary of these fare changes appears in the testimony of W. F. Ham, President of the Washington Railway & Electric Company, as published in the Hearings before the Subcommittee on Public Utilities

(*Footnote 53 continued on page 404*)

The steady decline in traffic and revenues between 1922 and 1928[54] prompted the Capital Traction Company, whose financial losses were consistently greater than those of the Washington Railway & Electric Company, to apply to the Public Utilities Commission in June, 1928 for a fare increase. The Commission dismissed this application without passing upon any of the issues involved. It held that an increase in rates at that time might prevent favorable action by Congress on the resolution permitting the merger of the transit companies.[55]

Failure of Congress to act on the merger resolution and continued decline in revenue prompted the Capital Company to renew its request for higher rates. It was joined almost immediately by the Washington Company. They alleged that the existing fare of 8 cents cash, or 6 tokens for 40 cents, was confiscatory. The Capital Company stated that its rate of return upon its *claimed* fair value was 4.30% in 1926, 3.92% in 1927, and 3.64% in 1928. The Washington Company's rate of return for the same years on what it termed its *minimum* valuation was 3.99%, 4.13%, and 4.32%. Company officials estimated that a higher fare of 10 cents cash, or 4 tokens for 30 cents, would increase income sufficiently to provide a return of 4.88% for the Capital Company and 6.25% for the Washington Company, both of which would still be less than the companies were legally entitled to earn.[56]

The Commission denied the fare increase on the following grounds: (1) that no acceptable rate-base existed upon which fares could be fixed and that a new valuation was a necessary prerequisite to further rate proceedings; (2) that differences in accounting methods of the two companies and certain accounting errors made ascertainment of actual operating expenses impossible; (3) that evidence as to the rate of return which would be produced under the increased rates was largely conjectural; and (4) that the companies could better their financial condition more surely and at the same time provide better service by concentrating their efforts on bringing to pass the unification of their properties without burdening their patrons with a higher fare.[57]

The Supreme Court of the District of Columbia, however, reversed the Commission's order and decreed that the new rate of 10 cents, 4 tokens for 30 cents, should become effective July 23, 1930. The Court held that the fair value figures cited by the companies should serve as minimum standards of value unless and until the Commission should order and complete a new valuation. The other grounds upon which the Commission had based its denial were dismissed as being of little or no legal significance. The Commission's appeal from this decree to the Court of Appeals

(*Footnote 53 continued from page 403*)

of the Committee on the District of Columbia, House of Representatives, 71st Congress, 2nd Session, on H. J. Res. 159, March 18, 1930, pp. 63-64.

[54] See the first instalment of this article, *op. cit.*, pp. 279-284.

[55] 16th *Annual Report*, Public Utilities Commission of the District of Columbia, 1929, p. 69.

[56] The Capital Company's *claimed* value of $26,080,147 was based upon the value fixed by the Court of Appeals of the District of Columbia, as of January 1, 1925, on appeal from the Commission's valuation of September 14, 1919, plus net cost of additions and betterments to January 1, 1929. The valuation figure for the Washington Company of $19,210,899 was based upon the Commission's 1919 finding, which the Company had continuously held to be too low, plus additions and betterments, to January 1, 1929. See 17th *Annual Report*, Public Utilities Commission, 1929, pp. 99-102; Opinion and Findings of the Public Utilities Commission of the District of Columbia in *Re Valuation of Capital Traction Company*, Order No. 338, September 4, 1919, pp. 111-116; and Opinion and Findings, etc., in *Re Valuation of Washington Railway & Electric Co.*, Order No. 339, September 4, 1919, pp. 178-181.

[57] See 17th *Annual Report*, Public Utilities Commission, 1929, p. 102.

of the District was in vain and the above rate has continued in effect.[58]

Effects of Fare Increases. Attempts to show the relationship between changes in rates of fare and changes in passenger traffic and revenues are not entirely satisfactory because it is impossible to isolate the effects of fare changes from the effects of various other factors influencing traffic and revenues. Such attempts must be made, however, if discussions of the results of fare changes are to be other than vague, biased, and unscientific. Table VI shows the changes in average fares received by the Washington trolley companies, together with the percentage changes from year to year in number of passengers carried and amount of passenger revenue received for the period 1917–1932, inclusive. Obviously, the data for the years 1917–1922 and 1929–1932 are of greatest significance, since important fare changes occurred during those periods.

TABLE VI. AVERAGE FARES AND PERCENTGAE CHANGES IN NUMBER OF PASSENGERS AND AMOUNT OF PASSENGER REVENUE OF THE CAPITAL TRACTION COMPANY AND THE WASHINGTON RAILWAY & ELECTRIC COMPANY, COMBINED, 1917-1932*

Year	Average Fare†	Annual Rate of Change in Average Fare (+ or −)	Annual Rate of Change in Number of Passengers (+ or −)	Annual Rate of Change in Passenger Revenue (+ or −)
1917	$0.0430	.....	.....	.....
1918	0.0440	2.23%	27.87%	30.73%
1919	0.0518	17.79	13.14	34.01
1920	0.0702	35.59	− 8.34	23.58
1921	0.0728	3.63	− 2.31	1.03
1922	0.0683	− 6.11	− 3.16	− 9.07
1923	0.0683	− 0.06	− 2.02	− 2.08
1924	0.0684	0.12	− 4.54	− 4.42
1925	0.0683	− 0.17	− 0.73	− 0.90
1926	0.0696	1.98	− 0.51	1.46
1927	0.0700	0.54	− 2.43	− 1.90
1928	0.0701	0.21	− 2.46	− 2.25
1929	0.0705	0.59	− 1.35	− 0.77
1930	0.0725	2.83	− 8.70	− 6.11
1931	0.0762	5.10	−11.24	− 6.77
1932	0.0779	2.27	−13.04	−11.06

* Based on the annual reports of the companies as contained in the *Annual Reports*, Public Utilities Commission of the District of Columbia, 1917-1932, inclusive.

† Calculated by dividing the total number of revenue passengers carried by the companies into the total amount of passenger revenue received. This covers motor bus as well as street car operations. The slight increases in average fare during 1926-1929, inclusive, were attributable chiefly to the increasing use of busses, many of which charged a straight 10-cent fare rather than the fare of 10 cents cash, or 4 tokens for 30 cents.

The influence of factors other than fare changes upon the traffic and revenues of the Washington traction companies was especially important during the 1917–1922 period. The 30.73% increase in revenue in 1918 was obviously the result of the great influx of people into Washington in connection with the war-time expansion of government activity rather than the result of the 2.23% increase in average fare. While traffic increased 13.14% during 1919, it would seem that the 17.79% increase in average fare was an important factor in causing the 34.01% jump in revenue. In 1920 the influence of fares was still greater, as revenues increased 23.58% while fares increased 35.59% and traffic decreased 8.34%. It is significant, however, that the rate of increase in revenue was lower between 1919 and 1920 than between 1918 and 1919, in spite of the fact that the rate of increase in average fare was twice as great in 1920 as in 1919. This would certainly indicate that there is a limit to the efficacy of fare increases as a means of offsetting traffic losses. Moreover, the loss of almost 16,000,000 passengers during 1920 was probably caused in part by the increase in fares. It is impossible to ascertain just when

[58] *Capital Traction Co. v. P. U. Commission*, Supreme Court of the District of Columbia, Equity No. 50618; *Washington Railway & Electric Co. v. P. U. Commission*, Supreme Court of the District of Columbia, Equity No. 50619. See 18th *Annual Report*, Public Utilities Commission, 1930, pp. 59-61 and 19th *Annual Report*, 1931, p. 8. Immediately following the announcement of the Court's decision, the Commission instituted new valuation proceedings for both companies. While the Commission announced the completion of these valuation proceedings early in 1933, it finally decided not to make public the exact fair value figures it had found nor to attempt to institute proceedings based upon these figures until after the merger should be consummated in December, 1933. No action has as yet been taken in connection with the valuation of the unified company. See *Evening Star*, October 20, 1932, and January 12 and February 9, 1933.

the decline in governmental activity gave way to automobile competition as the chief cause of the decline in number of passengers carried. Undoubtedly, the rise in car-fares between 1917 and 1921 stimulated use of other means of transportation, even though these fare increases were necessary to offset the rise in prices and, hence, in operating costs.

Study of the 1929-1932 data in Table VI shows that the utility companies erred in their predictions that the 1930 fare would swell their revenues. The 2.83% increase in average fare during 1930 was accompanied by a sharp drop in passenger revenue (6.11%) and the further 5.10% fare increase during 1931[59] was accompanied by a revenue decline of 6.77%. It would be inaccurate to attribute all the severe loss in traffic during 1930-1 and the resulting fall in revenues to the higher rate of fare, as the flood of cut-rate taxicabs occurred at almost the same time that higher car-fares went into effect. Nevertheless, the fare increase was a primary factor in stimulating the shift away from trolley-cars and busses to taxicabs and private automobiles. While there may be some truth in the rather pathetic statement frequently made by utility officials that the fare increase kept them from still greater revenue losses, the fact remains that it did not increase revenues and that it coincided with, if it did not actually accentuate, the tendency for revenues to decline. Moreover, revenues continued to decline at an even greater pace during 1932 and most of 1933.

Developments since 1930 have shown beyond a doubt the futility of increases in the general level of fares as a solution of Washington's transportation problem. Even if it should be granted that some benefits have accrued to the car companies through taxing the ever-dwindling residue of car-riders to make up for the desertion of their fellows to the competing agencies, it is unlikely that even the traction officials would favor a *further* increase in fares as a means of solving their problems. Like their brothers-in-distress, the steam railroad executives, they must have realized that insistence upon abstract legal rights to charge rates which will yield them a "fair return upon the fair value" of their property is folly in the face of motor competition. Legal rights developed as a part of the system of regulated monopoly which characterized local transportation prior to about 1920 cannot protect traction interests against economic forces which have destroyed to a large degree the old monopolistic conditions.

Analysis of Fare Reductions. The above discussion of the possibilities of a rise in the general level of rates suggests that the reduction of rates of fare might aid materially in solving the problems of the Washington transportation system. More justification appears for advocating this type of change than for urging an increase, since some increase in passengers carried would surely result. As the utility leaders have pointed out, however, an increased number of passengers is of no advantage unless revenues also increase. The only instances of fare reductions in Washington were, as pointed out above, in September, 1921, and March, 1922. The effects of these fare reductions are not encouraging to the advocate of reduced rates (Table VI). The 6.11% decline in average fares during 1922 was accompanied by a 9.07% decrease in revenue. In 1923 revenues fell 2.08% as average fare declined 0.06%. In neither year did the

[59] The 1931 increase in average fare was the result of higher rates in effect throughout the whole of 1931 as compared with merely the last five months of 1930.

reduction in fare prevent the downward tendency in number of passengers carried.

This one experience with fare reduction is insufficient to justify the conclusion that the use of this device at present would fail to stimulate traffic sufficiently to result in a net increase in revenue. It would, however, especially in view of the rather discouraging experience of traction companies in other cities,[60] deter Washington utilities from voluntarily reducing fares. Unless the upward tendency in earnings which set in in October, 1933[61] should result in an excessively large rate of return on whatever fair value figures may be agreed upon in the future, there is no means by which the traction interests can be forced to lower rates, however desirable reduced fares may be to the general public.

It is apparent, from the above analyses, that general changes in rate levels, either in the form of increases or decreases, offer slight, if any, solutions for the District's transportation troubles.

Changes in Rate Structure

Although changes in the general rate level offer slight prospect of easing Washington's transportation difficulties, modifications of the traditional uniform fare system look much more promising. Other utilities, notably the electric light and power and gas industries, have increased patronage through substituting differentiated rate structures for uniform rates. While the technological and economic characteristics of the local transportation industry will always prevent rate differentiation from being carried very far,[62] experience both abroad and in this country—indeed, in the District of Columbia itself—has shown that the uniform fare can be supplemented advantageously by such devices as weekly passes, nickel permits, zone fares, and special fares for special types of service.

The Weekly Pass. The weekly pass entitles the holder to ride any number of times during the week. The Washington Rapid Transit Company has been experimenting with this system since late in 1931, charging $1.00 for the regular, unlimited pass and 60 cents for a shopper-theater pass good only during the non-rush periods. Although officials of the Company were not overly enthusiastic about the pass during the first two years it was in effect, they have thought well enough of it to continue its use. It has probably made some contribution to the great improvement in the Company's revenues during the early months of 1934.[63] The experience of the Capital Transit Com-

[60] See Nash, L. R., *Economics of Public Utilities* (New York: McGraw-Hill Book Co., 1931), 2nd ed., pp. 290-291.

[61] See the first instalment of this article *op. cit.*, pp. 282-4 and 286-7.

[62] See Jones, E. and Bigham, T. C., *Principles of Public Utilities* (New York: Macmillan Co., 1931), pp. 375-386.

[63] In a letter to the writer dated September 6, 1933, President Merrill of the Rapid Transit Co. described the effects of the pass as follows: "I think the pass has been of some use in retaining patronage that might have gone to the 20-cent zone taxicabs . . . although in spite of passes we have lost about a third of our business in two years . . . During the first few months' use of the pass I tried to determine the effect on revenue and came to the conclusion that we had a slight increase—perhaps one or two per cent which might be attributable to the pass. Now I incline to the belief that the public has learned the *use* and *abuse* of the pass to such an extent that there is little if any benefit from it in the way of increased revenue. I still feel that it makes us many friends and holds some riders who would otherwise use cabs." He stated further that the relatively small part of the District's transit service furnished by his company and the lack of transfer arrangements with the car companies detracted from the value of the pass, particularly the shopper-theater pass. For the first 7 months of 1934, operating revenues of the bus company totalled $240,473, $21,000 more than was received during the same period of 1933. Net earnings were $9,031 as compared with a deficit of $33,618 for the first 7 months of 1933. (*Evening Star*, August 22, 1934.)

pany with the pass system since it was introduced in December, 1933 on its cars and busses provides strong evidence of the advantages of this system to both patrons and Company.[64] Traffic and revenue not only increased immediately after its inauguration, but they have continued to improve throughout the first half of 1934. Responsible observers attribute most of this improvement to the weekly pass.[65] Whether or not this device will continue to attract riders and to hold them in the future as it has done since December, 1933 is open to question.

The pass has not been uniformly successful throughout the country. While 59 companies were using the system on December 31, 1927, 30 other companies, after experimenting with it, had given it up.[66] L. R. Nash, an experienced utility student and operator, concludes that, while the weekly pass has been very successful as a competitive weapon and as a means of creating good-will toward the company using it, it has not been particularly successful in increasing and maintaining revenues under normal circumstances.[67] The first part of Nash's statement has certainly been illustrated by developments in Washington, as the weekly pass seemed to have been made to order for the competitive situation which has faced the transit industry since 1930 and it worked a veritable revolution in converting the ill-will of the community into good-will.[68] The chance that the advantages of the weekly pass will be less clear once the acuteness of the competitive situation has been permanently lessened necessitates caution in depending too much on it as a long-time means of providing reasonable rates and adequate revenues. It should be pointed out, in addition, that from a theoretical point of view the weekly pass is even less scientific than the uniform fare, in that the charge per ride under the former bears even less relation to the cost per ride than under the latter system which is frequently criticised because of its scientific basis.

The Nickel Permit. The nickel permit system, which gives the holder of a permit costing $1.00 per month, or thereabouts, the privilege of paying 5 cents per ride instead of the higher cash or token fare, has certain theoretical advantages over the weekly pass. It represents a serious attempt to apply sound principles of rate-making to the urban transportation industry in that the rate is broken up into two parts—a demand or "readiness-to-serve" charge and a consumption charge. The monthly charge pays, roughly, for the facilities provided for the car-rider whether or not he uses them. The nickel fare may be thought of as a payment for the service actually used, although it is impossible to measure the exact cost of each passenger ride.

Of greater immediate interest to the

[64] The Capital Company issues two types of passes. One sells for $1.00 and entitles the holder to an unlimited number of rides between Sunday and Saturday, inclusive, except on busses which charge more than the 7½-cent token fare. Two cents extra must be paid in order to use the pass on the various feeder busses charging 10 cents straight. The other pass, selling for $1.25, is good on all cars and busses, except those few busses which charge in excess of 10 cents. (*Evening Star*, October 31, 1933, February 27, 1934.)

[65] See *Ibid.*, June 18 and July 17, 1934; also the first instalment of this article, *op. cit.*, p. 286.

[66] See Jones and Bigham, *op. cit.*, pp. 385-6; Leeds, C., 19 *Aera* 151-8 (March, 1929); American Electric Rlwy. Assn., *Bulletin* No. 180 (1928); Jackson, Walter, 12 *National Municipal Review* 131-5 (March, 1923); 3 *Public Utilities Fortnightly* 775 (1929); and Mosher, W. E. and Crawford, F. G., *Public Utility Regulation* (New York: Harper & Brothers, 1933), pp. 305-6.

[67] Nash, *op. cit.*, p. 288.

[68] As will be pointed out in a later section of this study, much of this good-will was lost during the winter of 1933-4 through the inability of the new Capital Transit Company to furnish adequate service to the increased number of car and bus patrons.

student of Washington's transportation problems is the inherent advantage of the nickel permit as a stimulator of traffic and revenue. Mr. Nash, while skeptical of the revenue-producing powers of the weekly pass except as a temporary competitive weapon, is a strong proponent of the nickel permit and looks for its more extended use in the future.[69] Although the introduction of the nickel permit into the Washington rate system would be attended by administrative difficulties, its successful use in other cities indicates that these difficulties would not be insurmountable. Objections by those passengers who chose to pay the higher cash fare rather than purchase the permit would probably develop. It is no more than just, however, that occasional passengers should pay a fare high enough to compensate the company for providing sufficient equipment to furnish this occasional service. The traveling public in general would undoubtedly look favorably upon the new system since the net result would be to lower the cost per ride[70] and to place in effect the next best thing to the popular fare of five cents straight. This would tend not only to increase the number of passengers carried but should tend also to increase revenues, without injuring the interests of patrons.

Zone Fares. The most widely discussed type of change in the Washington transit rate structure has been the introduction of the zone fare system. Members of the Public Utilities Commission, the People's Counsel, and other public representatives have been suggesting and the traction officials opposing this type of fare for years. The latest move in this direction was initiated in September, 1932, when People's Counsel Keech urged the adoption of a 5-cent fare for short hauls in the downtown section. The plan was shelved for "further study" after the traction officials had expressed their unwillingness to put it into effect, at least until after Congress had passed upon the pending merger legislation, unless assured that they would not lose money thereby.[71]

In March, 1933, the Commission revived the question by proposing a modified zone plan under which a 5-cent fare during rush hours on certain short-haul lines in the congested area would be adopted for a trial period. The plan was to intersperse the low-fare cars among the regular through cars in such a way as not to interfere with the existing schedules. This change was expected to make possible the substitution of short-haul cars for many of the through cars, thus eliminating the expense of operating practically empty cars over a long route in order to serve the short-haul passengers in the down-town district. The traction officials were just as cold toward this suggestion as to earlier ones. They argued that such a plan would result in further loss of revenue rather than greater revenue and reiterated their opposition to any such changes at least

[69] Although only 15 cities had used the nickel permit up to 1931, no serious objections to it have arisen. It is still used successfully in Racine, Wisconsin, where it originated. Nash believes that the slight extent to which it has been used has been attributable to lack of advertising more than any other factor. Nash, L. R., *op. cit.*, p. 289.

[70] On the basis of the present token fare on the Washington lines of 4 tickets for 30 cents or 7½ cents per ride and assuming that each passenger traveled an average of 60 rides per month, the monthly charge would be $4.50. Under the nickel permit, the monthly total, assuming that the permit would cost $1.00, would be 60 times 5 cents or $3.00, plus $1.00, or $4.00. If a person bought more than 60 rides per month, which is not unlikely, especially since it is customary to make these permits transferable, or if the company should abandon the token fare, retaining only the 10-cent cash fare of the present system, the advantage to the permit-holder would be even greater.

[71] See *Evening Star*, September 4-6, 10, 11, and 27 and October 5, 10, and 12, 1932.

until after the consummation of the merger.[72]

Progress toward the establishment of an experimental 5-cent rate for short hauls received an unexpected stimulus in June, 1933, when two suburban bus lines carrying passengers from nearby Virginia into the District began to carry local passengers at a nickel fare over that portion of their lines which lay within the District.[73] The Commission ordered the practice stopped and denied the formal request of the suburban companies to renew it on the ground that they were competing directly with the established routes of the Washington Railway and Electric Company and thus tended to prevent the latter from performing necessary service at reasonable rates. The Commission, however, criticized sharply the unwillingness of the local traction companies to meet the demands of the Washington public for modern transportation at reasonable rates and ordered the Washington Company, which had complained bitterly against the cut-rate competition of the Virginia companies, to institute a 5-cent fare bus line to serve the territory traversed by these companies. In the face of this criticism, the Company did not contest this order and put the line into operation on August 21, as a noon-hour proposition. Shortly afterward, lack of patronage caused the substitution of extra bus service at the 5-cent fare during the rush-hours for the noon-hour service. The problems incident to the merger of the two traction companies the following December and the successful use of the weekly pass have obscured, temporarily at least, the zone-fare question and prevented further use of this system in the District.

The possibility of the more extensive use in the National Capital of some form of zone fare prompts brief consideration of the general advantages and limitations of this type of rate. Experience with zone fares in this country has indicated that the European zone system, providing for a large number of small zones a mile or so in length with a basic rate equivalent to two or three cents for the first zone and additional charges in proportion, is not applicable to American conditions.[74] Attention can thus be concentrated on the American plan which provides for a low rate in a relatively large central area and a somewhat higher rate in the rest of the city. In Washington this would mean a low rate within a radius of about two miles of Fourteenth Street and New York Avenue, N. W., and a higher rate outside this area.

Cleveland affords perhaps the best illustration of the use of this two-zone system. Establishment of a 2-cent fare in the downtown section of that City in 1930 increased the number of passengers almost 400% within three weeks. After the fare had been raised to 3 cents, revenues also showed a sizeable increase over what they had been under the old system.[75] Experiments with 5-cent zones, however, did not stimulate traffic to any great degree in Cleveland. Although too close an analogy should not be drawn between Cleveland and Washington, because of the rather scattered

[72] *Ibid.*, March 16, 17, 1933.

[73] The companies involved were the Alexandria-Barcroft-Washington Rapid Transit Co. and the Arlington & Fairfax Motor Transportation Co. See *Ibid.*, July 18, 21, and August 14, 15, and September 8, 1933; also personal letter dated September 7, 1933 from A. G. Neal, vice-president and comptroller, Washington Railway & Electric Co.

[74] See selection from Blake and Jackson's *Electric Railway Transportation* in Dorau, H. B., *Materials for the Study of Public Utility Economics* (New York: Macmillan Co., 1930), pp. 882-9.

[75] See Mosher and Crawford, *op. cit.*, pp. 301-6; also Alexander, J. H., "Regulating Car Fares", 6 *Public Utilities Fortnightly* 732 (1930).

location of government buildings within the downtown area, the presence of many apartment buildings within this section, and the large number of transcients traveling through this downtown district, the five-cent fare would probably not be low enough to attract passengers to a materially greater degree than it did in Cleveland. Possibly, however, a 3-cent fare in the downtown area of Washington would provide a real stimulus to traffic and result in higher revenues.

The above discussion of zone fares is incomplete in that no mention is made of their disadvantages. Such disadvantages do exist and cannot be ignored. In the first place, the necessity of collecting two or more fares instead of one imposes unavoidable administrative burdens on the companies using the system. These burdens must be looked upon as necessary costs which must be offset by other advantages if the system is to be successful. The successful use of zone fares in such cities as Cleveland, Milwaukee, Boston, and even in Washington itself on those transit lines which serve the Maryland suburbs would seem to indicate that these burdens are not insuperable;[76] nevertheless, they cannot be ignored. A second disadvantage is the fact that the zone system discriminates against patrons living near the zone limits and also that real estate values in the outlying sections may be injured by people moving into the low-fare areas. If people should move into the low-fare areas, it naturally follows that congestion in those areas would be increased. That these are real possibilities cannot be denied. Zone fares should be introduced into the District only if it appears that their favorable effects upon the traveling public as a whole would be sufficient to offset possible injuries to specific groups of patrons and property owners.[77]

While it is impossible to forecast the exact effects of the inauguration of zone fares on the Washington transit lines upon the interests of users of the cars and busses, as well as property owners, two factors would tend toward the conclusion that such effects would be generally advantageous. In the first place, the zone system would lessen the existing discrimination, inherent under the single-fare system, against the short-haul rider as compared with the long-haul rider. This is undoubtedly a more serious type of discrimination than that which would arise near the zone limits, especially in a two-zone system which is the only type that would be suitable in the District of Columbia. Secondly, the writer's personal experience as a former Washington resident and government employee prompts him to the conclusion that more than a difference in transportation rates would be required to cause Washington's workers, most of whom are government employees with a somewhat larger annual income, on the average, than workers in cities with a more diversified population, to forego the advantages of suburban life. A more likely result would be that those now living in the outlying sections would continue to pay the old rate of fare and be grateful for the opportunity to ride at the lower fare when business or pleasure caused them to ride within the low-fare area. Possibly, even, the zone system might increase the tendency of suburban residents to drive their own automobiles to a point far enough out from the congested area to avoid park-

[76] See statement of the experience of the Eastern Massachusetts Street Railway Co. of Boston, as described in the *Evening Star*, October 5, 1932; also Mosher and Crawford, *op. cit.*, pp. 301-306.

[77] See *Ibid.*, p. 302 and decision in *Re Springfield Street Railway Co.* (Mass.), P. U. R. 1918 C 515.

ing difficulties, and then take cars or busses down town. Many persons living and working in or near the central area would certainly be tempted to ride rather than walk if the fare were lowered to 3 cents, or even to 5 cents. The shift, consequently, would be from private cars and "shanks horses" to trolley-cars and busses rather than from suburban to downtown residential sections. In this connection it is significant that European cities with their highly-developed zone-fare systems are less congested, as a rule, than our own American cities with their uniform fares.

L. R. Nash predicts a greater use of zone fares in this country, especially where material traffic losses have developed under the uniform-fare system.[78] This is obviously the case in the District of Columbia and the future should see further experimentation on the transit lines of that territory.

Special Fares for Special Types of Service. Perhaps the best example of a special fare for special service is the 25-cent charge for the deluxe, through-bus service which the Capital Traction Company has operated successfully since 1925 between such exclusive residential districts as Chevy Chase and Cleveland Park and downtown Washington. It is unlikely, however, that the extension of this system would contribute materially to solving the larger problems of the transit industry, as such services would never be used by more than a very small minority of the District's residents.

The practice of charging 10 cents straight on the feeder bus lines, as compared with the fare of 10 cents, or 4 tokens for 30 cents, on the trolley and connecting bus lines can be viewed as another instance of a special fare for a special service, in so far as the higher charge is designed to cover the higher costs of serving the newer, more sparsely populated suburban sections. If, however, these feeder lines are looked upon as coordinate parts of the entire system rather than as isolated lines which must stand upon their own feet, the higher charge would appear to be an extra charge for standard service and, hence, be unreasonably discriminatory as compared with rates on other parts of the system. Various trolley lines are probably just as unprofitable as most of these bus lines and no attempt is made to charge the patrons of the former higher fares. Undoubtedly many long rides entirely by street-car to and from some of the older sections of the District actually cost more than some bus-car rides or rides entirely by bus for which the higher fare is charged. It is certainly unsound to charge certain riders higher fares because they happen to live in sections which have been built up since the motor bus was developed. Under the old "pre-bus" conditions, street car lines would sooner or later have been extended to these sections at considerably greater expense than would be incurred in the inauguration of bus service and no additional charge would have been levied on those who traveled on the new line.

Moreover, even if it were true that the cost per ride on the feeder bus routes was higher than the cost per ride on the longer car lines, thus justifying the higher charge, it would still be out of harmony with a second principle of rate-making—namely, that rate structures should be built up in such a way as to attract additional patrons. Where the two principles—the "cost-allocating" principle and the "merchandising" principle—conflict, the latter should control in the street railway industry. This is true, even in normal times, for two reasons. In the first place, street

[78] Nash, *op. cit.*, pp. 286-287.

railways are decreasing cost industries and any increase in traffic because of lower fares on feeder lines would tend to result in a more than proportionate increase in net revenue. Each extension of service widens the possible use of the system as a whole by patrons in all other parts of the city. These feeder lines may thus so increase the use of older parts of the system that they will approach the point of complete utilization and enable the company to secure the advantages of decreasing unit costs. It is not too much to expect of the passengers on the older part of the system that they bear whatever losses may be incurred during the short time in which these feeder lines may operate at a deficit. The rapid growth of the suburban areas in and around the District of Columbia since these feeder bus lines were established indicates that these lines have a good chance to become self-supporting.

A second reason for placing greater emphasis on the "merchandising" principle is that determination of the exact cost per ride is seldom, if ever, possible. Too large a proportion of the costs are joint rather than costs which can be allocated directly to each passenger or class of passengers. It is especially important that the merchandising principle of rate-making be given greater weight in Washington. All possible methods of winning back and retaining the thousands of passengers who have been lost to the taxicabs and private automobiles should be applied, if the mass transportation agencies are to continue to render adequate service at reasonable rates. The uniform treatment of bus and car riders, that is, charging those who use the feeder busses the same lower token fare that other passengers pay, should result in some increase in traffic, comparatively small immediate loss of revenue, and perhaps ultimate increase in revenues.[79]

The subject of special fares cannot be dismissed without mention of the school-fare question which crystallized in February, 1931, with the passage by Congress of an act authorizing the Public Utilities Commission to establish reduced fares for school children at not more than 3 cents. There is little doubt but what the lower rate for children, set by the Commission at 3 cents, entailed direct losses in revenue by the car companies. The financial loss involved, however, is insignificant when compared with the social gains of furnishing economical transportation to school children in a city in which it is necessary for them to use public transportation agencies in going to and from school. Although the school problem has further complicated the financial difficulties of the transit companies, the fact that their court battle to annul the reduced fares was dropped and their acceptance of a clause in the merger agreement providing for lower school-fares would indicate that the financial burdens are not considered unbearable. If these losses continue or increase, they must, of course, be distributed among other patrons in the form of either higher rates than they would otherwise pay, inferior service, or both. The continuance of this socially desirable 3-cent fare for school children is dependent upon the working out of the general transportation problem in the District.[80]

[79] This topic and the related question of free transfers between cars and between cars and busses will receive further consideration in connection with the discussion of the merger.

[80] President Ham of the Washington Railway & Electric Co. estimated, a few months after the school-fares became effective, that the loss amounted to 3.972 cents per school-fare collected, or approximately $92,000 annually. President Hanna of the Capital Traction Co. estimated that school-fares would cost his company about $47,000 during the first year. Little

(Footnote 80 continued on page 414)

Although deluxe bus service and the carrying of school children, as well as such special services as furnishing chartered busses for group travel, sightseeing, etc., will probably continue to be offered by the transit companies at special rates, generally speaking, this type of modification of the uniform fare cannot be of major significance in improving service, attracting additional traffic, and affording a reasonable rate of return to the transit industry.

Summary. The above analysis of the contributions which changes in rate structures may make toward remedying Washington's local transportation difficulties centers around the weekly pass, nickel permit, and the two-zone system. The chief argument in favor of any or all these devices is that they would be popular with the traveling public and be of great aid in winning back the patrons lost to taxicabs and private automobiles. The utility companies, until recently, have opposed them on the ground that they are all in the nature of fare reductions which would result in great revenue losses, even though they might increase the number of passengers.

The success of the weekly pass, however, since its inauguration by the new Capital Transit Company in December, 1933, should soften the opposition of the utility officials to other modifications of the uniform fare. The nickel permit and the zone system are not only capable of supplementing the weekly pass in winning back patronage but they offer peculiar advantages of their own. The nickel permit, in particular, has great possibilities in that it is capable not only of attracting but holding passengers and making regular riders out of them. It should be more effective than the weekly pass in meeting the competition of the private automobiles, which is so much more deeply entrenched than taxicab competition.

Improvement of Service

Complaints as to the quality of service rendered by the transportation industry of the District have been frequent and vigorous throughout its history. While some of these complaints have been the unjustified, unreasonable complaints of chronic fault-finders to which all utility companies are subject, certain basic conditions have tended to make service unsatisfactory.

In the first place, the lines have been routed in such a roundabout, indirect way that travel between the downtown district and practically all residential sections is unreasonably slow and tedious. In the second place, cross-town service, except for a few bus-lines, is virtually non-existent.[81] Third, with the exception of a small number of relatively direct bus lines, nothing in the Washington transportation system can be dignified by the term "rapid transit." There are no subways nor elevated lines. The bulk of the service is furnished by the inherently slow surface cars. Most of the busses are routed so indirectly and stop so frequently to take on and discharge passengers that they are but little faster than the trolley-cars. A fourth condition working against good service is the lack of diversification of

(*Footnote 80 continued from page 413*)
has been heard of these losses in the past year, however, and the low fares for school children have apparently been accepted as a permanent part of the rate structure. See *Evening Star*, February 22 and June 26, 1931, and December 22, 1932; see also 19th *Annual Report* of the Public Utilities Commission, 1931, pp. 31-32.

[81] The writer has a vivid recollection of spending slightly less than two hours journeying by street car from Tennallytown, in extreme Northwest Washington, to the end of 14th Street, due east from Tennallytown, and of spending about 15 minutes in making the same trip at a later date by private automobile at approximately the same time of day and under much the same weather conditions.

Washington's working population which makes for unusually severe traffic congestion in the downtown area and on the main arteries leading out of this area during the morning and evening periods when government employees are on their way to and from their offices. Still another cause of poor service is the poor financial condition of the traction companies during the past ten years or so which has made them unwilling and, at times, unable to purchase needed equipment. Many cars which have been kept in operation have been uncomfortable, poorly heated and ventilated, noisy, and slow. A sixth and perhaps the most important condition which has kept service at low levels has been the lack of coordination and wasteful duplication and congestion inherent in a transportation system made up of three separate and, to some extent, competing companies.

Attempts to improve service must naturally be aimed at the removal of the above conditions. Citizens' associations, the local press, and individuals have constantly emphasized the need of meeting these problems. The Public Utilities Commission has heard complaints and issued many orders directing the companies to make improvements.[82] The companies have not only carried out the Commission's orders but have voluntarily attempted to improve the quality of transportation service by making traffic surveys, purchasing what new equipment they could afford, and by experimenting with "express" cars, the "skip-stop" system, and other devices aimed at speeding up service. For the most part, all such efforts have accomplished little toward doing away with the basic obstacles to adequate service. All parties concerned have hesitated to take any drastic steps until after the hoary question of the merger should be settled.

The inauguration of unified operation under the new Capital Transit Company December 1, 1933 has resulted in disappointingly slow progress toward satisfactory service. As a matter of fact, service during the first few months after the merger was worse than it had been in many years.[83] Finally, in the attempt to put service on a permanently higher level, intensive surveys were begun by various civic groups, the Public Utilities Commission, and officials of the Capital Company with a view toward bringing about a thorough rerouting of the transportation lines and the possible substitution of busses for cars in various sections of the District.[84] So closely tied up with the merger question is this whole topic of service improvement that further discussion of it must be postponed until after the merger itself has been considered.

Control of Taxicabs

Solution of the District's taxicab problem is an essential step in putting the local transportation system on a sound basis. As previously pointed out,[85] the competition afforded the *regulated* street railway and bus lines by the thousands of *unregulated*, cut-rate taxicabs which have flooded Washington since 1930 has been a prime factor in explaining the chaotic condition of the mass transportation industry. Although

[82] In 1928, for instance, out of 147 complaints mostly as to service, the Commission satisfied 76, denied 61, and took no action on 10 cases. Out of 28 requests made by the transportation companies to make changes in service, 25 were granted. (16th *Annual Report* of the Public Utilities Commission, 1928, pp. 41-47 and 51-54.

[83] This was attributable partially to the severe weather but chiefly to the greatly increased number of passengers following the introduction of the weekly pass. See *Evening Star*, February 5, 14-17, 1934.

[84] See *Ibid.*, April 27, July 17, August 3, 7-16, inclusive, 1934.

[85] See first instalment of this article, *op. cit.*, pp. 285-7.

some improvement was noted after October 1, 1933, when a majority of the taxicab companies agreed to adopt somewhat higher rates and more definite zones, the situation was still bad enough late in the following summer to be characterized by People's Counsel Roberts as "disorganized" and "unsatisfactory."[86]

Adverse Public Effects of Unregulated Taxicab Service. Although the unregulated cabs, with their cheap rates of fare within wide zones, have been viewed by many citizens as socially desirable, closer study is bound to reveal that the adverse effects far outweigh the benefits.

In the first place, the low zone fares have literally been "too good to be true." They do not cover costs and, hence, are unreasonably low. Chief Accountant Bachman of the Public Utilities Commission estimated in October, 1931, an average monthly loss of $97.55 per cab.[87] In August, 1934, People's Counsel Roberts stated that sworn statements of about 3,000 drivers showed an average gross income of less than $6.00 per day, out of which the rental for the cab, usually $4.00 per day or more, and all costs of operation had to be paid before any net earnings were available to drivers.[88] The whole history of the taxicab situation in the District since the summer of 1930 illustrates clearly the vicious effects of unrestricted competition. The inauguration of the first flat-rate cabs diverted business from the established meter companies and, at the same time, attracted new business to the industry as a whole. The profits of the pioneer flat-rate companies encouraged them to put on more cabs and attracted new companies. The increased supply of cab service caused the flat-rate companies to cut their rates. The old-line companies were forced to change from the meter to the flat-rate basis and set their fare still lower than that charged by the newer companies. All companies, new and old, then launched into unrestrained, cut-throat competition. Various operators withdrew part or all of their cabs on the ground that they could not afford to continue. The number of cabs in operation, however, continued to increase because of the willingness of the rental companies to supply the capital for the vehicles and the eagerness of unemployed and partially-employed persons to secure work, even at meager wages and for long hours. Partial stability was reached with the general acceptance of the 20-cent fare throughout most of the city during the summer of 1931 and with the slight additional increase in fares and agreement as to zone boundaries late in 1933. The immediate burden of this below-cost operation of cabs has rested upon the drivers in the form of reduced incomes and long hours.[89] Its continuance has been possible only because of the widespread unemployment situation. The ultimate burdens have been and will be borne by the public.

Those low taxi fares have diverted so many patrons from the trolley cars and busses as to raise the possibility of suspending the latter type of operations.

[86] See *Evening Star*, August 15, 1934.

[87] See *Ibid.*, October 22, 1931.

[88] *Ibid.*, August 15, 1934.

[89] In the case of those drivers who had been employed by the old-line companies, cut-throat competition also meant reduced employment or complete dismissal. The Black and White and Yellow Cab Companies announced in September, 1932, the withdrawal of 125 cabs from service with the consequent laying off of 250 employees because they refused to continue operating at a loss of 2¼ cents per mile. See *Ibid.*, September 16, 1932. A strike of union cab-drivers against the Diamond Taxicab Co. in the spring of 1931, while indirectly related to the competitive situation, was specifically aimed at securing the closed shop. It was not successful and not particularly important, except as a reminder that the Taxicab Drivers' and Chauffeurs' Union still lived in Washington in spite of the poor working conditions of cab drivers. (*Ibid.*, March 18, 27, 28, 1931.)

While suspension would be a serious matter for investors and employees[90] of the transit companies, it would not in itself be socially disadvantageous if the taxicabs were capable of providing dependable city-wide service. No extended argument is required to show that it would be physically impossible for taxicabs to provide all commercial transportation required in such a metropolitan area as the District of Columbia. Even if they could be run on a regular schedule and give satisfactory service otherwise, the larger amount of space required per passenger by taxicabs than by street cars and busses would make traffic congestion, already serious, virtually unbearable. Taxicabs are in no sense mass transportation agencies and should not be permitted to endanger performance by street cars and busses of the mass transportation service for which they are fitted.

A third unfavorable aspect of the taxicab situation is that fares have been discriminatory as well as unreasonably low. The short-haul passenger within each zone pays a considerably larger amount per mile than does the long-haul passenger. This, of course, is also true of the uniform charge for street railway service, but the railways do not have available the tried and tested system of meter rates which are in general use throughout the country. A second type of discrimination arises because zones are arranged in such a manner as to result in some relatively short rides being two-zone rides and other considerably longer rides being only one-zone rides. Still a third form of discrimination grows out of the fact that the passenger, particularly the stranger, is frequently not familiar with zone boundaries. The poorly-paid driver, struggling to secure something over and above his high daily rental charge and other costs, is under constant temptation to charge the unsuspecting passenger the fare for a two- or three-zone ride even though the entire trip is actually confined to one zone. The acceptance by some companies of a plan providing for standard, clearly defined zone boundaries has been only partially successful in eliminating this type of discrimination.[91]

A further adverse effect of the lack of regulation of taxicabs is the hazard to public safety. Low fares, high rental charges, and intense competition force the drivers to work long hours and to drive recklessly at high rates of speed in order to make a bare living. A further source of accidents is the congestion resulting from the extremely large number of taxicabs on the streets, many of which are merely "cruising."[92] These

[90] Late in 1931, Division 339 of the Amalgamated Association of Street and Electric Railway Employees, the members of which were employed by the Capital Traction Co., filed with the Public Utilities Commission a brief pleading for regulation of taxicabs. (*Ibid.*, October 30, 1931.) John P. Colpoys, editor of the *Trades Unionist*, speaking for the Washington Central Labor Union, urged that taxicab rates be fixed high enough so as not to offer direct competition to the street cars, at a hearing before the Commission a few months earlier. (*Ibid.*, August 20, 1931.)

[91] In October, 1931 the Police Department was receiving, on the average, 20 complaints per week of overcharging. Mr. Jouett Shouse, about two years later, complained to the Commission that he had been charged 35 cents for a four-block ride by a driver who claimed that was his regular first-zone charge, even though all cabs in that district which had previously been patronized by Mr. Shouse were 20-cent cabs. (See *Evening Star*, October 19, 1931, and December 29, 1933.) In outlining its objections to the zone fares, the Public Utilities Commission concluded that the various forms of discrimination described above are inherent in the system and that it is entirely unsuitable for a city the size of Washington. (See 19th *Annual Report* of the Public Utilities Commission, 1931, p. 43).

[92] Supt. of Licenses Coombs reported in July, 1931, that approximately 3,300 cabs had been licensed since January. This meant a cab for every 147 persons in Washington, as compared with one cab for every 3,000 persons in New York City. Because parking spaces reserved for cab stands provided room for only 900 cabs and cab-drivers are arrested for parking off these stands, most of the taxis must cruise more or less constantly. See *Evening Star*, April 12, July 30, 1931, and June 21, 1932.

conditions have borne fruit in a steady increase in the number of accidents involving taxicabs. There were 595 such accidents in Washington in 1929, 1,205 in 1930, 1,750 in 1931, and 2,024 in 1932.[93] This situation appears in an even more serious light when it is realized that passengers, drivers, and the general public, except in the case of some of the older and stronger companies, are seldom indemnified against injury, death, or property damage. Neither the profitable rental companies nor the many independents, as a rule, have carried liability insurance. While some of the rental companies have voluntarily paid out of their profits damage claims arising from accidents involving their cabs, the general tendency has been for them to shift liability to the individual drivers through the ingenious device of transferring the nominal ownership of the cabs to "associations" of drivers. Instead of paying a daily rental charge the drivers pay daily "membership fees" for certain benefits, chief among which is the acquisition of the legal title to the vehicle at the end of a certain period. The former rental company then becomes merely a centralized administrative agency handling the telephone calls for the various drivers, providing repair facilities, etc. Most of the individual driver-members are financially irresponsible. The net result has been to make recovery from taxicab owners or operators for damages arising out of taxicab accidents the exception rather than the rule. Even the drivers of the rental cabs or of the newer "association" cabs are not protected by the workmen's compensation law because they are "lessees" or nominally independent operators of their own cabs rather than "employees."[94]

Attempts to Regulate the Taxicab Industry. The Public Utilities Commission has been thoroughly familiar with the evils described above, but has been hampered in its attempt at control by the legal uncertainty as to the exact extent of its powers over taxicabs. The organic law creating the Commission (37 U. S. Stats. 972) did not specifically list taxicabs among the public utilities subject to its jurisdiction, although it did include "common carriers" and defined

[93] Early in 1933, the Citizens Joint Transportation Committee, citing figures of the National Safety Council, reported that Washington rated among the four worst cities in the United States of more than 250,000 population as regards its automobile fatality rate. It amounted to 25.4 per 100,000 population in 1932 as compared with an average of 17.0 per 100,000 persons for the other cities in this class and with 18.0 for Washington itself in 1930. (See *Ibid.*, January 12 and 23, 1933.)

[94] Justice Hitz of the Court of Appeals of the District of Columbia has called attention to this serious lack of responsibility of the taxicab interests in no uncertain language. In *Rhone v. Try Me Cab Co., et al.* (65 Fed. 2d 834), decided May 29, 1933, he said: "For we now have in Washington hundreds of taxicabs engaged . . . in a public calling; . . . holding out to the public an illusion of incorporated responsibility which they do not possess; painted, named and numbered to heighten that illusion; each cab constituting a potential danger both to its passengers and the public; yet having no financial responsibility to either beyond an equity of redemption in some used car . . . While our duty is to apply the law as we find it, in this respect we find it so unsatisfactory that we feel impelled to suggest that some change should be made, either by legislative enactment or municipal regulation. Perhaps an improvement of this situation can be found in a system of compulsory insurance preliminary to the license and running in rem with the car in favor of any one injured by its negligent operation." On the same day, in *Callas v. Independent Taxi Owners Association, Inc., et al.* (66 Fed. 2d 192), Justice Hitz continued: "If a corporation chartered as a cab company may bring under its general control a fleet of a thousand taxicabs and hold itself out as a public service corporation engaged in their operation, and at the same time evade responsibility by showing that it is merely a beneficial association providing a centralized administrative bureau through cooperative effort, it is apparent that public authority should insure to the public some other protection against the growing menace. Recent cases before this court impel us in the discharge of our duty to call attention to this situation." See also 20th *Annual Report*, Public Utilities Commission, 1932, pp. 13, 74 and *Evening Star*, September 16, 1932; April 3 and October 17, 1933; and May 17 and June 6, 1934.

them in such a manner as to encourage the Commission to attempt to regulate taxicabs. Some of the cab companies, however, challenged its jurisdiction by appealing an order directing them to make certain reports to the Commission. After three years of litigation the Supreme Court upheld the Commission's jurisdiction over the taxicab industry, except as to that part of its business which partook of the nature of a private livery business not originating from public stands.[95] Since all taxicab business does not originate from public stands, the whole question of the Commission's powers over taxicabs has been left in a clouded status.

On the basis of the above decision, however, the Public Utilities Commission carried on a sort of haphazard, spasmodic regulation over taxicabs until 1928, when it plucked up its courage to the extent of promulgating a general order covering the "attachment, use, and testing of taximeters."[96] Late the next year it tentatively adopted an elaborate code of rules and regulations covering all conceivable phases of the taxicab business and put them into effect January 1, 1930. Within a few weeks, however, the cab interests were successful in convincing the Supreme Court of the District that the provisions in the code requiring all operators of cabs to satisfy the Commission of their financial ability to pay all damages resulting from accidents was invalid. By the end of the year this decision had been affirmed by the Court of Appeals of the District of Columbia.[97]

With the influx of the 35-cent zone taxicabs early in the summer of 1930, the Commission voluntarily suspended its rule requiring every cab to be equipped with a meter rather than run the risk of being again reversed by the Courts. It did inform all operators that the balance of its November, 1929 code was still in force and directed them to begin at once the monthly filing of reports as to earnings, operating costs, capital outlay, rates in force, etc. It secured only partial compliance, however, and hesitated to take any drastic steps to enforce either this or the various other orders which it issued from time to time during the hectic months of 1930 and 1931 because of the uncertainty with respect to its exact powers.[98]

Finally, aroused by the evils which accompanied its "laissez-faire" or "salutary neglect" policy, the Commission, after conducting extensive hearings, adopted new rules and regulations, the highlight of which was a provision requiring all taxicabs to install meters on or before January 10, 1932, and to substitute a rate of 25 cents for the first 2 miles or fraction thereof and 5 cents for each additional ⅛ mile for the existing hodge-podge of zone rates, of which the three-zone rate of 20 cents, 40 cents, and 60 cents was most common.[99] This time the appeal of the taxicab people to the Courts was unsuccessful, as

[95] *Terminal Taxicab Co. v. Kutz*, 241 U. S. 252. See also 1st *Annual Report*, Public Utilities Commission, 1913, pp. 10, 75; 3rd *Annual Report*, 1915, pp. 8, 9, 132; and 4th *Annual Report*, 1916, pp. 5, 8.

[96] 16th *Annual Report*, 1928, pp. 55-57.

[97] *Smith v. Patrick, et al.*, Supreme Court of the District of Columbia, Equity No. 59,476 and *Patrick et al. v. Smith*, Court of Appeals of the District of Columbia, No. 5168. See 17th *Annual Report* of the Public Utilities Commission, 1929, pp. 95-98 and 18th *Annual Report*, 1930, pp. 61-64 and 81.

[98] Included among these orders were orders relating to the form of reports, conditions under which notice of changes in fares should be filed, streets over which cabs were barred from cruising, the form in which the name of the cab-owner and the rate of fare should appear on the cab, etc. See *Evening Star*, June 19, August 18, 19, 1930; January 27, August 5 and December 10, 1931. See also 18th *Annual Report*, 1930, pp. 29-44 and 19th *Annual Report*, 1931, pp. 30-31.

[99] 19th *Annual Report*, pp. 43-47, 1931 and *Evening Star*, April 12, July 26, August 4 and 19, October 19-23, and November 7, 1931.

Justice Adkins of the District Supreme Court, after an unusually thorough analysis of the arguments and evidence supporting the views of both the cab companies and the Commission, upheld the latter at every point, with the exception that the effective date for installation of the meters was postponed to August 25, 1932.[100] It was not enough, however, for the Commission to secure Court support for its taximeter order, for at this point Congress intervened by tacking onto the 1933 Appropriation Act for the District Government a rider prohibiting the Commission from using any of its appropriation to enforce this order.[101] This has effectively stopped the Commission from exercising control over taxicab rates. Obviously, the only means by which rate stability can be permanently accomplished is for Congress to be educated to the inherent difficulties of the zone system and folly of attempting to perpetuate it merely because it provides cheap taxicab rides for the time being and also provides a dubious sort of unemployment relief.

Proof of financial responsibility as a prerequisite to the operation of a cab is a second desirable end which cannot be accomplished without a change of heart on the part of Congress. What is needed here, however, is positive Congressional action in the form of a law specifically empowering the Commission to require all cab operators to obtain bonds or insurance policies or furnish other evidence of financial responsibility rather than the mere removal of the rider in the Appropriation Act preventing the enforcement of the meter order. The Courts, as indicated above, have held the Commission to be without power to require such showing of financial responsibility whereas they have upheld the legality of the taximeter order. For a number of years compulsory liability legislation has been urged upon Congress by the Commission, the Citizens Joint Transportation Committee, and many other groups. Such a law was finally passed by the Senate in May, 1934, but killed in the House of Representatives for much the same reasons as were advanced by the opponents of the order to install taximeters. These were chiefly (1) that the cost of insurance or bonds would be so high as to force many small operators out of business and (2) that the "paradise" of plentiful taxicab service at cheap rates would be destroyed both because of the need of charging high enough fares to cover the added costs and because of the natural effect of diminished competition.[102]

Unable to proceed directly through eliminating the zone-rate system and the financially irresponsible driver, the Commission attempted to accomplish these ends indirectly by an order aimed at eliminating the rental companies, which have generally been looked upon as the agencies primarily responsible for the taxicab muddle. This order, issued in August, 1932, decreed that no public vehicle should be operated except by the owner or a bone fide employee of the owner. Little came of it, however, except the arrest and immediate release of a few operators of rental cabs and the revocation of the licenses of the vehicles involved. The rental companies, like public utility holding companies, are not public utilities themselves; hence, the Public Utilities Commission has not

[100] *City Cab Corp. et al. and Bell Cab Co. et al. v. Parick et al,*. Supreme Court of the District of Columbia, Equity Nos. 53736 and 53732, 20th *Annual Report* of the Public Utilities Commission, 1932, pp. 63-75. This opinion is probably the best available account of the entire taxicab problem in the District.

[101] See first instalment of this article, *op. cit.*, p. 289.

[102] See 20th *Annual Report* of the Public Utilities Commission, 1932, p. 13; also *Evening Star*, March 3, 1932; January 23, February 8, April 3 and October 17, 1933; and May 2, 14, and 22 and June 7, 1934.

been able to reach them directly. Moreover, they soon worked out a device for nullifying the effect of the above order. Their drivers were organized into "associations" to which "membership fees" of $4.00 per day were paid in return for certain benefits, chief among which was the gift of the vehicle as a bonus at the end of one year. Drivers were thus given the status of owners rather than lessees or renters paying a daily rental of $4.00. Here, again, the Commission failed to secure control over the taxicab industry.[103]

The passage of the National Industrial Recovery Act affords still another possible means of establishing control over the Washington taxicab situation, this time, of course, through the N. R. A. rather than through the Public Utilities Commission. The National Association of Taxicab Owners made public, in August, 1933, a proposed code of fair competition providing, among other things, that the rental system be abolished and that rates be based on a study of operating costs plus a reasonable profit. At the same time, this Association recommended that the N. R. A. appoint a commission to investigate the Washington taxicab situation, especially with a view of determining "whether the taxicab operating situation would not be much improved if taximeters were installed on all taxicabs." As late as August 15, 1934, however, no such code had been adopted, no investigation had been made by the N. R. A., and the rental system was still flourishing.[104] Moreover, except for the Independent Taxicab Operators' Association, the members of which operate about ⅓ of the cabs in the District under the name of "Diamond Cabs" and which has always favored the meter system, taxicab operators and owners have ignored the President's Reemployment Agreement or "blanket code" and have evinced no interest in the adoption of a code for the industry.

Summary. From the above discussion it is evident that all attempts to regulate the taxicab industry in Washington have failed. What further steps may be taken toward clearing up the mess depends upon which of four points of view prevails.

The first, adhered to by the owners of the prosperous rental taxicabs, an indefinite number of drivers, and a similarly indefinite portion of the traveling public, and various civic leaders and members of Congress who sincerely believe that the present situation is satisfactory, opposes taking any immediate action. While possible social dangers are involved in forcing out the small operator as the result of the introduction of effective Commission regulation and thus raising fares, nevertheless, when these are weighed against the disadvantages of the existing situation, with its uneconomic rates, abominable working conditions, menace to public safety, and disturbing influence upon the entire local transportation service, this attitude appears to be unsound.

A second view is that, while the present situation is not desirable, the situation will take care of itself as progress toward economic recovery is made and many of the taxicab drivers secure other employment. When immediate remedies are available, however, the solution of this local problem should not wait on national recovery, uncertain and slow as it is proving to be.

The third view would look to the

[103] See *Evening Star*, September 16 and 22 and October 1 and 27, 1932; also 20th *Annual Report* of the Public Utilities Commission, 1932, p. 27.

[104] See resolution adopted by the National Association, as printed in the *Star*, August 21, 1933; also *Ibid.*, August 6, and August 15, 1934.

N.R.A. and the taxicab code authority for a solution. This seems a forlorn hope in view of the failure of the Washington taxicab industry to show any interest in such a code and in view of the uncertainty surrounding the future status of the N.R.A. Moreover, the clearing up of Washington's taxicab difficulties should not be dependent on the future rise or fall in influence of such a national agency.

The fourth point of view is that the taxicab problem can be solved surely and simply by Congressional action authorizing the Commission to require taxicab operators to present proof of financial responsibility and permitting it to enforce its meter order which legally went into effect during the summer of 1932. Such action would give the Public Utilities Commission the opportunity which has been denied it for so many years of instituting effective regulation over taxicabs and treating them on a par with other public utility enterprises. A review of the facts of the taxicab situation and of the history of attempts to improve it shows conclusively that this fourth view must prevail if taxicabs are to make their proper contribution to the development of a unified, coherent transportation system. The responsibility rests upon Congress to sweep off its own doorstep the most notoriously confused and disorderly taxicab situation in the United States and thus make an important contribution to the solution of the general local transportation problem in the District of Columbia.

In the third and final article of this series, the author will analyze the terms of the unification agreement by which the Capital Transit Company took over the operation of the bulk of the Washington transportation system, together with the actual and possible future effects of the merger of the underlying companies, and consider the possibilities of government ownership as an ultimate solution to the District's transportation difficulties.

Summaries of Research

Further Developments in Reorganization of Defaulted Real Estate Bond Issues

A SURVEY of the daily papers indicates that considerable progress is now being made in putting distressed real estate properties back on their feet. During the five years of the depression lengthy foreclosure proceedings have been completed and new owners now control a large percentage of income properties. An analysis of the figures for 1934 indicates a sharp decline in the number of foreclosures compared to the peak year of 1933. During the first six months of 1933 there were 9,868 foreclosures in Cook County, Illinois. In the first six months of 1934 there were only 7,496, a reduction of 25%.

For some time real estate bondholders have been receiving new securities in place of the first mortgage bonds they had originally purchased. During August and September, 1934 a review of the work of 18 bondholders' committees in the Chicago area shows that 33,234 persons holding bonds with a face value of $38,360,400 either became owners of the properties involved or received new paying bonds. A considerable number of buildings have completed reorganization and have been returning dividends or interest in small amounts to their new owners.

An analysis of 15 typical plans used in reorganizing the financial structures of apartment buildings in Cook County, Illinois appeared in earlier issues of this magazine.[1] A brief survey of the present position of these buildings after nearly two years may be of interest. Five of the plans were found unsuitable and were abandoned. New securities have been delivered under several plans but no interest or dividends have been paid since in nearly every instance the available net income has been needed to liquidate back taxes. At the present time the revenue from these properties is barely sufficient to take care of operating expenses. There are indications, however, that vacancies are steadily being absorbed and that the time is fast approaching when competition will again determine the rental to be obtained. Higher rentals together with economical management will be immediately reflected in payments to security holders. Plan 13, involving the use of certificates of beneficial interest under a liquidation trust, has made four disbursements of 2% each, or 4% a year; the original first mortgage bond called for 6½%. Under the common law trust plan earnings have been paid for two years, 2% the first year and ¾ of 1% the second year. Twenty-five cents a share has been paid on the voting trust certificates used in Plan 11. Plan 1 paid out $75.80 in cash and confidently expected to pay the remaining $24.20 in two years, but no further disbursements have been made to date.

An increasing number of real estate news items give notices of the payment of interest and dividends on reorganization securities of other build-

[1] Jones, Carrie Maude, "Apartment House Bonds: Some Plans for Reorganizing Defaulted Issues," 9 *Journal of Land & Public Utility Economics* 358-367 and 10 *Ibid.* 67-77 (November, 1933 and February, 1934).

ings. A few properties are making cash distributions as high as 6%. In August, 1934 the completion of the reorganization of Drake Towers was announced. This plan involves the use of stock trust certificates and income bonds. The bonds bear interest at 6% a year and the first semi-annual interest of 3% was delivered with the new securities. The Devon Glenwood property has just paid 2% on the new securities which are being exchanged for certificates of deposit held by former bondholders. One issue sold by the Peoples Securities Company and the Peoples Trust and Savings Bank amounting to $72,000 has been paid in full together with all accrued interest and issues totaling $1,661,500 sold by the same institutions have been paying either full or reduced interest. The Shoreland Hotel has completed its reorganization using the liquidation trust plan with certificates of beneficial interest. Two dollars a unit on each certificate has already been distributed. Holders of certificates of deposit for bonds of the 6300 Kenmore Apartments received a cash distribution of $3 on each $100 bond in July. The Forest Crest Building has reorganized its financial structure by extending the maturity date and reducing the interest from 6% to 5%. It has been meeting its interest payments regularly and hopes to pay its bondholders the additional 1% at an early date.

The orderly process of reorganization and readjustment which has taken place has been facilitated by federal legislation. The new amendments to the Bankruptcy Act, particularly Section 77 B, were passed in order to eliminate the expenses of foreclosure and receivership and to make the income immediately available to bondholders. Under the provisions of this Act it is possible to bring the creditors together with the owner upon his request for the purpose of considering and adopting a plan of readjustment. This procedure takes place under the jurisdiction of the District Court and both creditors and debtors are protected to the full extent of the law. Minority creditors are bound by whatever plan is acceptable to the majority of the creditors, providing no fraud can be proved in the plan itself or in obtaining the consent of the creditors. This eliminates entirely the possibility of gain to "holdouts" which has obstructed the readjustment of many properties. The owner is given access by law to the names and addresses of his creditors and upon proper showing is allowed to continue in possession of his property subject only to reasonable restrictions. Concurrent with the use of the new bankruptcy amendments by many building corporations during the last three months, a federal investigation has been under way to determine "in what manner the rights and equities of bondholders and owners can be protected against undue and unjustified loss upon their investment."[2] Congressman Adolph J. Sabath's committee is now meeting in 12 large cities. Testimony has already been gathered in Chicago but no report has as yet been issued.

The earlier articles, referred to above, were concerned entirely with the position of buildings financed by first mortgage bonds.[3] No mention was made of the leasehold bond situation which has been so acute in the larger cities. In a leasehold bond development the land is leased for a long period of years, usually 99, to the building corporation and ground rent is paid periodically. Most leases contained a clause provid-

[2] H. Res. 412.

[3] Jones, *op. cit.*

ing that if ground rent or taxes were not paid the building would revert to the owners of the land. In several instances this reversion has taken place and the bondholders have lost their security.

An unusual reorganization plan for a leasehold issue has just been proposed which is notable in its fairness to all parties concerned. Number One LaSalle Street Building in Chicago was financed with an issue of 6% first mortgage leasehold sinking fund bonds in the latter part of 1928. It defaulted in interest four years later (1932) with the total issue of $5,250,000 outstanding. An issue of general mortgage bonds is also outstanding and subordinate to the first mortgage leasehold bonds. The property is a 47-story office and store building in the heart of Chicago's financial district. The land is leased for a period of 99 years from the University of Chicago. The lease stipulates that the ground rent must be paid quarterly in advance at the following rates:

May 1, 1932 to April 30, 1933	$172,077.50
May 1, 1933 to April 30, 1935	245,808.75
May 1, 1935 to April 30, 1949	268,155.00
May 1, 1949 to April 30, 1959	290,501.23
May 1, 1959 to April 30, 1979	299,439.74
May 1, 1979 to April 30, 2028	312,847.50

Since May 1, 1933 the building has not had sufficient income to take care of the step-up in rent to $245,808.75 but has continued to pay the former rental of $172,077.50. Taxes for 1930, 1931, and 1932 have been paid in part and objections have been filed for most of the outstanding amounts. Taxes for 1933 and 1934 have not yet been billed.

It is expected that at the forthcoming foreclosure sale the committee will bid in the property in order to protect the interests of the first mortgage bondholders, unless a sufficiently high bid is received from the outside. The second mortgage bondholders and the owners have agreed to waive their privileges of redemption in return for a small portion of the new securities to be issued.

A new corporation will be organized with an authorized capital of a maximum of 60,000 shares of common stock. Title will be conveyed to the new company. This stock will be distributed as follows: 89% to depositing first mortgage bondholders (except 900 shares to holders of second mortgage bonds); 11% to the present owners.

In the event the reorganization plan is accepted by the bondholders,[4] the University of Chicago has agreed to revise the ground lease, stipulating an annual minimum ground rent of $200,000 a year from May 1, 1933 to April 30, 1934; $175,000 from May 1, 1934 to April 30, 1938; and $200,000 for the remaining years of the lease. Also the amended ground lease calls for an additional amount of 10% of the gross income in excess of $700,000 a year to $900,000 and an amount equal to 20% if the income exceeds $900,000 a year. Funds must be deposited for all back taxes and monthly deposits must be made regularly to take care of estimated and currently accrued but not billed taxes. A sinking fund will also be built up out of monthly payments of $1,666.67 until $100,000 has been accumulated which will be used to meet the costs of major capital expenditures in connection with the maintenance and preservation of the building. There will be no distribution of income to the common stockholders until the reserve fund has been established.

[4] Any depositor who dissents has 20 days in which to register his protest. Before withdrawing his bonds he must (1) submit a written notice of dissent; (2) pay 1½% of the face amount of his bonds as his proportionate share of the reorganization expenses; (3) present his indorsed certificate of deposit with a bank guarantee of indorsement satisfactory to the depositary.

All the shares of common stock of the new company will be deposited under a trust agreement. Trust certificates will be issued to bondholders at the rate of one share of common stock for each $100 in face amount of bonds deposited. The trustee, who has taken active charge of the property since the default, has accumulated $384,377.11 in funds during this period. The plan calls for using $100,000 to pay off non-depositing bondholders at the foreclosure sale and $50,000 is set aside for other reorganization expenses. The balance will accrue to the reserves required for ground rent, taxes, and maintenance. Any further expenses of reorganization will be paid out of net income after the reserves have been created.

The plan of reorganization is under the supervision of the Circuit Court and bondholders have recourse to this Court for stating all objections. It is reported that 82% of the outstanding bonds have been deposited with the bondholders' committee.

This plan of reorganization for a large leasehold issue is notable in that the bondholders maintain their interest in the property and do not lose their entire investment as they may under the terms of the lease. It is possible for the property to carry the proposed rental even in the stringent times of the present and, with additional revenue in the future, the building can afford to increase its ground rent payments. While the bondholders have changed their status from that of creditors to joint owners, this is quite preferable to losing the building entirely. The bondholders cannot depend upon the 6% stated in their bonds but will receive after a long period dividends contingent upon the net income available for this purpose.

The plan is most satisfactory to the owners and to the second mortgage bondholders since they are not eliminated but retain an active interest in the reorganization in proportion to their present interests. The lessor stands to lose most by having cut the ground rent over the entire period to nearly $6,000,000. However, there is a possibility of recovering this amount and perhaps receiving more because of the percentage clause in the new lease. Some of the features of this reorganization plan will probably be used in other leasehold issues requiring adjustment.

Progress during the past year is evidenced by a closer cooperation between bondholders and the groups attempting to formulate reorganization plans. Economic conditions have also changed and tend to affect the welfare of these properties favorably. Some little progress has been made in the direction of tax relief. The bottom of the rental market has been reached and there is a gradual tightening up of available space. As more normal conditions appear, the earnings from these properties will probably increase and bondholders will begin to realize some return on their investments after years of uncertainty and confusion. But the reorganization of defaulted mortgage bond issues and leasehold issues will continue to be a major problem for some years.

CARRIE MAUDE JONES

Book Reviews

Black, Russell Van Nest. PLANNING FOR THE SMALL AMERICAN CITY. *Chicago: Public Administration Service, 1933. pp. 90. $1.*

Mr. Black's monograph is one of a series of Public Administration Service publications aimed particularly at the problems of the smaller municipality—in this case the community with a population under 50,000. It is not primarily a technical treatise on planning design. Its purpose is rather to tell operating officials and interested citizens what planning involves, what general benefits are to be derived from it, how practically to get planning under way, and how to carry on after the so-called plan has been prepared. It does all this in a concise and interesting way.

Mr. Black predicts a decline in the relative importance of the metropolis and an increase in that of the small city. This is rather doubtful if he has in mind independent small cities outside metropolitan areas. Many of these smaller cities are increasing but, in general, they are not increasing as rapidly as are similar cities within metropolitan districts, and the metropolitan districts as a whole are taking a lion's share of the total increase in population—both of the United States and of most of the individual states. For the United States, in 1920-30, about ¾ of the total increase in population was accounted for by the increase within the metropolitan areas. In New York State for the 30-year period, 1900-30, 99.5% of the total population increase was accounted for by the increase of its seven metropolitan districts.

Mr. Black, in common with all planners, stresses the preparation of the comprehensive master plan. I am beginning to wonder whether we have not somewhat overdone this, with the result that planning as a continuous process is somewhat slighted. Our emphasis on The Plan has tended to produce an impression of comprehensiveness and finality quite at variance with the facts. At best, the master plan is only a first step in planning. Efficient planning must be a continuous process. Emphasis should be placed not on The Plan, but on Planning.

Of course, it is often much easier to obtain public support for the preparation of a comprehensive physical plan than for carrying on planning as a permanent governmental function. The first is concrete, the second abstract. As a result we have had quite a flood of city plans, while effective planning lags.

ROBERT WHITTEN.

Macfadyen, Dugald. SIR EBENEZER HOWARD AND THE TOWN PLANNING MOVEMENT. *Manchester: Manchester University Press, 1933. pp. ix, 166. 10s 6d.*

A court stenographer, simple, domestic, absent-minded, much influenced by Henry George and Edward Bellamy, writes a little tract called *Tomorrow*. An association is formed to further the purposes outlined in the tract; most of the first members come from the Land Nationalisation Society. There have been hundreds of such idealists able to gather a little following for a new idea. What saved this man, this group, and this idea from the common fate, and led to Letchworth, Welwyn, Wythenshawe—and even this year, Corby? Mr. Macfadyen, long a resident of Letchworth, lecturer, publicist, and Rotarian, has written a discursive book (incorporating memoirs of Howard's family and friends), painting a picture of the man and tracing the growth of the garden city movement. The answers that Mr. MacFadyen gives to our question seem to be that the times were ripe, and that Howard attracted to himself young men who were destined to do big things. And, of course, Mr. Macfadyen makes clear that Howard's success is not to be measured by the few tens of thousands of people who live in the handful of simon-pure garden cities; the town planning policy of many countries has been influenced by his idea. Mr. Macfadyen portrays successfully the simplicity and charm of his hero's character.

CHARLES S. ASCHER.

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